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U.S. DEPARTMENT OF COMMERCE **Malcolm Baldrige, Secretary of Commerce**
NATIONAL TECHNICAL INFORMATION SERVICE

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GOVERNMENT REPORTS

Announcements & Index

Volume 83, Number 2 January 21, 1983

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* Committee on Scientific and Technical Information

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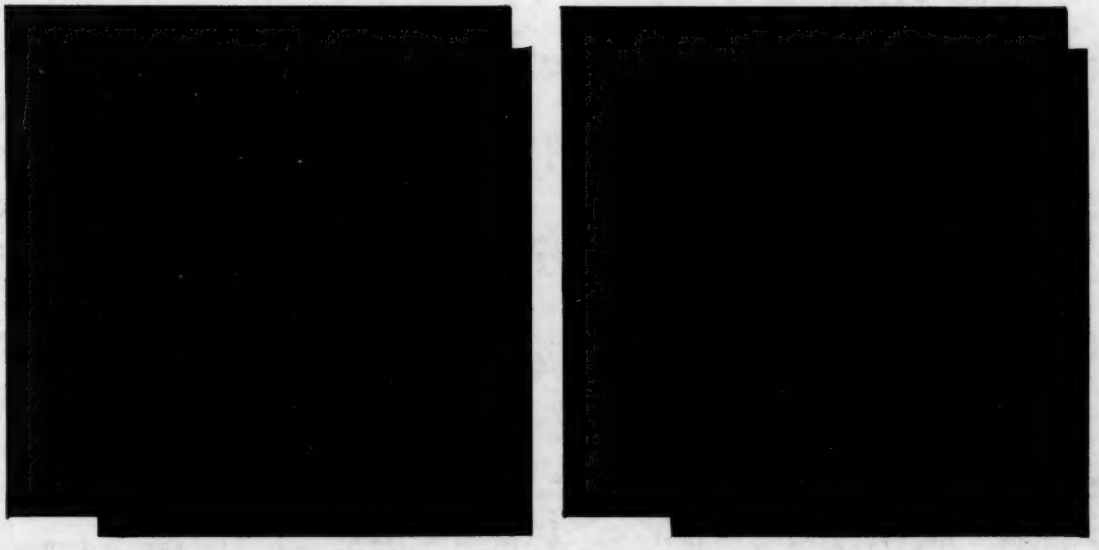

1. AERONAUTICS

1A. Aerodynamics

AD-A119 467/9 PC A07/MF A01
Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.

Helicopter Vibration Suppression Using Simple Pendulum Absorbers on the Rotor Blade.
Final rept.,
G. Alvin Pierce, and M-Nabil H. Hamouda. Sep 82, 140p NASA-CR-3619
Grant NSG-1592

The objectives of the present investigation are: (1) Develop a mathematical model to represent the blade-pendulum system. A single nonuniform rotor blade with a hingeless hub restraint undergoing coupled flapwise bending, chordwise bending, and torsional vibrations is considered. Simple pendulum absorbers are individually treated for both flap and lead-lag types of motion. The blade is excited by an azimuthal harmonic variation of spanwise airload distributions associated with the elastic deformations and the cyclic pitch environment of forward flight; (2) Find the dynamic response characteristics of the blade-pendulum system, using the transfer matrix method; (3) Determine the optimum pendulum tuning to suppress the hub reactions. This entails the minimization of these reactions by appropriate variations of the pendulum parameters for a given excitation frequency. The pendulum parameters include the uncoupled pendulum frequency, hinge spanwise location and pendulum mass; and (4) Conduct a parametric study of the optimum tuned configuration. The parameters to be varied include pendulum hinge offset, precone, prepitch and pretwist. The intention of this investigation is to document the effects of these parameters on the optimum configuration previously established and thereby provide useful design criteria for future installations of pendulum absorbers.

N82-31293/5 PC$5.00
National Aeronautics and Space Administration, Washington, DC.

Aeronautical Engineering: A Continuing Bibliography with Indexes.
Jul 82, 114p NAS 1.21:7037(150), NASA-SP-7037(150)

This bibliography lists 382 reports, articles and other documents introduced into the NASA scientific and technical information system in June 1982.

N82-31295/0 PC **A05**/MF **A01**
United Technologies Research Center, East Hartford, CT.
A Doublet Lattice Method for the Determination of Rotor Induced Empennage Vibration Airloads. Analysis Description and Program Documentation.
S. T. Gangwani. Jun 82, 68p NAS 1.26:165893, UTRC81-7, NASA-CR-165893
Contract NAS1-16058

An efficient state-of-the-art method was developed to determine the unteady vibratory airloads produced by the interaction of the main rotor wake with a helicopter empennage. This method was incorporated into a computer program, Rotor Induced Empennage Vibration Analysis (RIEVA). The program requires the main rotor wake position and the strength of the vortices locates near the empennage surfaces. A nonlinear lifting surface analysis is utilized to predict the aerodynamic loads on the empennage surfaces in the presence of these concentrated vortices. The analysis was formulated to include all pertinent effects such as suction of the interacting vortices and the shed vorticity behind the empennage surfaces. The analysis employs a time domain solution. The output of the program consists of chordwise and spanwise airload distributions on the empennage surfaces. The airload distributions are harmonically analyzed and formulated for input into the Coupled Rotor/Airframe Vibration Analysis.

N82-31296/8 PC **A05**/MF **A01**
United Technologies Research Center, East Hartford, CT.
A Prescribed Wake Rotor Inflow and Flow Field Prediction Analysis, User's Manual and Technical Approach.
T. A. Egolf, and A. J. Landgrebe. Jun 82, 79p NAS 1.26:165894, UTRC81-2, NASA-CR-165894
Contract NAS1-16058

A user's manual is provided which includes the technical approach for the Prescribed Wake Rotor Inflow and Flow Field Prediction Analysis. The analysis is used to provide the rotor wake induced velocities at the rotor blades for use in blade airloads and response analyses and to provide induced velocities at arbitrary field points such as at a tail surface. This analysis calculates the distribution of rotor wake induced velocities based on a prescribed wake model. Section operating conditions are prescribed from blade motion and controls determined by a separate blade response analysis. The analysis represents each blade by a segmented lifting line, and the rotor wake by discrete segmented trailing vortex filaments. Blade loading and circulation distributions are calculated based on blade element strip theory including the local induced velocity predicted by the numerical integration of the Biot-Savart Law applied to the vortex wake model.

N82-31297/6 PC **A03**/MF **A01**
United Technologies Corp., Stratford, CT. Sikorsky Aircraft Div.
User's Manual for the Automated Paneling Technique (Apt) and the Wing Body Aerodynamic Technique (Wabat) Programs.
Final Report.
R. E. Studwell. Jun 82, 44p NAS 1.26:165895, NASA-CR-165895
Contract NAS1-16058

User instructions for the Tektronix Graphics Package of the Automated Paneling Technique (APT) and the Wing and Body Aerodynamic Technique (WABAT) Programs are provided. Responses to plot package messages which the user must make to activate plot package operations and options are described. Modifications to the APT and WABAT input run streams, to affect the graphic interface, are also covered.

N82-31298/4 PC **A06**/MF **A01**
United Technologies Research Center, East Hartford, CT.
Aeroelastic Analysis for Helicopter Rotors with Blade Appended Pendulum Vibration Absorbers. Mathematical Derivations and Program User's Manual.
Final Report.
R. L. Bielawa. Jun 82, 109p NAS 1.26:165896, UTRC81-45, NASA-CR-165896
Contract NAS1-16058

Mathematical development is presented for the expanded capabilities of the United Technologies Research Center (UTRC) G400 Rotor Aeroelastic Analysis. This expanded analysis, G400PA, simulates the dynamics of teetered rotors, blade pendulum vibration absorbers and the higher harmonic excitations resulting from prescribed vibratory hub motions and higher harmonic blade pitch control. Formulations are also presented for calculating the rotor impedance matrix appropriate to these higher harmonic blade excitations. This impedance matrix and the associated vibratory hub loads are intended as the rotor blade characteristics elements for use in the Simplified Coupled Rotor/Fuselage Vibration Analysis (SIMVIB). Sections are included presenting updates to the development of the original G400 theory, and material appropriate to the user of the G400PA computer program. This material includes: (1) a general descriptionof the tructuring of the G400PA FORTRAN coding, (2) a detaild description of the required input data and other useful information for successfully running the program, and (3) a detailed description of the output results.

N82-31299/2 PC **A03**/MF **A01**
United Technologies Corp., Stratford, CT. Sikorsky Aircraft Div.
User's Manual for the Coupled Rotor/Airframe Vibration Analysis Graphic Package.
Final Report.
R. E. Studwell. Jun 82, 27p NAS 1.26:165897, NASA-CR-165897
Contract NAS1-16058

User instructions for a graphics package for coupled rotor/airframe vibration analysis are presented. Responses to plot package messages which the user must make to activate plot package operations and options are described. Installation instructions required to set up the program on the CDC system are included. The plot package overlay structure and subroutines which have to be modified for the CDC system are also described. Operating instructions for CDC applications are included.

N82-31300/8 PC **A03**/MF **A01**
Flow Research, Inc., Kent, WA.
Singularity Embedding Method in Potential Flow Calculations.
W. H. Jou, and H. Huynh. Jun 82, 28p NAS 1.26:166387, NASA-CR-166387
NASA ORDER A-77471B

The so-called H-type mesh is used in a finite-element (or finite-volume) calculation of the potential flow past an airfoil. Due to coordinate singularity at the leading edge, a special singular trial function is used for the elements neighboring the leading edge. The results using the special singular elements are compared to those using the regular elements. It is found that the unreasonable pressure distribution obtained by the latter is removed by the embedding of the singular element. Suggestions to extend the present method to transonic cases are given.

N82-31301/6 PC **A10**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY.
Axisymmetric and Non-Axisymmetric Exhaust Jet Induced Effects on a V/STOL Vehicle Design. Part 2: Analysis of Results.
W. C. Schnell. Jan 82, 202p NAS 1.26:166365, NASA-CR-166365
Contract NAS2-9887

A wind tunnel investigation, employing a 1/8 scale model in an 11 foot transonic wind tunnel (Mach 0.4-1.4), was conducted to determine the jet effects of several exhaust nozzles on the aeropropuisive performance of a V/STOL fighter design. The force and pressure data show that significant differences in aeropropulsion performance can be expected by varying the exhaust nozzle type, jet area and deflection angle on an underwing nacelle installation. At unvectored conditions, the single expansion ramp nozzles show large performance gains relative to a circular nozzle installation. Additionally, a further drag reduction is realized when the nonaxisymmetric nozzle is vectored through a 10 degree deflection angle. The combined payoff of the vectored nonaxisymmetric nozzle over the baseline circular nozzle installation is equivalent to 25 percent of zero lift drag.

N82-31302/4 PC **A06**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY.
Axisymmetric and Non-Axisymmetric Exhaust Jet Induced Effects on a V/STOL Vehicle Design. Part 3: Experimental Technique.
W. C. Schnell. Jun 82, 115p NAS 1.26:166147, NASA-CR-166147
Contract NAS2-9887

The jet induced effects of several exhaust nozzle configurations (axisymmetric, and vectoring/modulating variants) on the aeropropulsive performance of a twin engine V/STOL fighter design was determined. A 1/8 scale model was tested in an 11 ft transonic tunnel at static conditions and over a range of Mach Numbers from 0.4 to 1.4. The experimental aspects of the static and wind-on programs are discussed. Jet effects test techniques in general, fow through balance calibrations and tare force corrections, ASME nozzle thrust and mass flow calibrations, test problems and solutions are emphasized.

N82-31303/2 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Supercritical Maneuvering Fighter Configuration. Wind-Tunnel Investigation at Mach Numbers of 0.60 to 0.95.
M. J. Mann, C. E. Mercer, and R. L. Campbell. Sep 82, 69p NAS 1.15:84513, L-15399, NASA-TM-84513

A wind tunnel investigation was conducted to study the application of supercritical technology to highly maneuverable combat aircraft. The configuration studied has a leading-edge sweep of 45 deg and an aspect ratio of 3.26. Two supercritical-wing shapes were tested at Mach numbers from 0.60 to 0.95 with angles of attack from -2 deg to 17 deg. On supercritical wing was designed to achieve a high level of transonic maneuver performance at a Mach number of 0.90; however, excessive flow separation developed on this wing at a Mach number of 0.85. A second supercritical wing was tested which had significantly reduced flow separation and improved drag characteristics at a Mach number of 0.85 and maintained the performance of the original wing at the higher Mach numbers. Leading-edge vortex generators did not improve the performance of the second wing; however, a sharp leading-edge flap produced sizable drag reductions at Mach numbers from 0.60 to 0.90.

N82-31304/0 PC **A09**/MF **A01**
Stanford Univ., CA. Dept. of Aeronautics and Astronautics.
Hybrid State Vector Methods for Structural Dynamic and Aeroelastic Boundary Value Problems.
L. L. Lehman. Aug 82, 195p NAS 1.26:3591, NASA-CR-3591
Contract NGL-05-020-243

A computational technique is developed that is suitable for performing preliminary design aeroelastic and structural dynamic analyses of large aspect ratio lifting surfaces. The method proves to be quite general and can be adapted to solving various two point boundary value problems. The solution method, which is applicable to both fixed and rotating wing configurations, is based upon a formulation of the structural equilibrium equations in terms of a hybrid state vector containing generalized force and displacement variables. A mixed variational formulation is presented that conveniently yields a useful form for these state vector differential equations. Solutions to these equations are obtained by employing an integrating matrix method. The application of an integrating matrix provides a discretization of the differential equations that only requires solutions of standard linear matrix systems. It is demonstrated that matrix partitioning can be used to reduce the order of the required solutions. Results are presented for several example problems in structural dynamics and aeroelasticity to verify the technique and to demonstrate its use. These problems examine various types of loading and boundary conditions and include aeroelastic analyses of lifting surfaces constructed from anisotropic composite materials.

N82-31310/7 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).

A Fast-Solver Algorithm for Steady Transonic Potential-Flow Computations with Newton Iteration and Multigrid Relaxation.
J. W. Boerstoel. 10 Oct 81, 24p NLR-MP-81056-U
Contract NIVR-1853
Presented at 4TH Gamm Conf. On Numer. Methods in Fluid Dyn., Paris, 7-9 Oct. 1981.

An algorithm based on an approximate Newton iteration of the nonlinear finite difference equations of transonic flow was tested on fully conservative potential flow around airfoils. It is found that the iteration to the circulation must be kept outside the multigrid algorithm. Meaningful residual norms, to be used in termination tests of loops, can be designed using finite-difference formulas with asymptotic scaling. Mass-flux-vector splitting solves instability problems encountered at sonic lines with artificial-viscosity terms. A special subalgorithm outside the multigrid algorithm is needed to update shock positions. The Newton/multigrid algorithm is very efficient for subsonic flows around airfoils with lift. For transonic flows, the algorithm is convergent.

N82-31638/1 PC **A03**/MF **A01**
Connecticut Univ., Storrs. Dept. of Mechanical Engineering.
Turbine Endwall Single Cylinder Program.
Semiannual Status Report, 1 Jan. - 1 Jul. 1982.
L. S. Langston. 1 Jul 82, 50p NAS 1.26:169278, NASA-CR-169278
Grant NSG-3238

Detailed measurement of the flow field in front of a large-scale single cylinder, mounted in a wind tunnel is discussed. A better understanding of the three dimensional separation occuring in front of the cylinder on the endwall, and of the vortex system that is formed is sought. A data base with which to check analytical and numerical computer models of three dimensional flows is also anticipated.

N82-31639/9 PC **A06**/MF **A01**
City Coll., New York. Turbomachinery Lab.
Experimental Study of Turbulence In Blade End Wall Corner Region.
R. Raj. Aug 82, 110p NAS 1.26:169283, RF-05438, NASA-CR-169283
Contract NAG3-122

Corner flows and wall pressure fluctuations, design and fabrication of the test model, preliminary resuls on boundary layer, flow visualization, turbulence intensity and spectra measurements are presented. The design consideration and fabrication report on the newly built wind tunnel to be used for subsequent continuation of the research effort is also presented.

N82-31645/6 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Laminar Flow Control, 1976 - 1982: A Selected Annotated Bibliography.
M. H. Tuttle, and D. V. Maddalon. Aug 82, 82p NAS 1.15:84496, L-15434, NASA-TM-84496

Laminar Flow Control technology development has undergone tremendous progress in recent years as focused research efforts in materials, aerodynamics, systems, and structures have begun to pay off. A virtual explosion in the number of research papers published on this subject has occurred since interest was first stimulated by the 1976 introduction of NASA's Aircraft Energy Efficiency Laminar Flow Control Program. The purpose of this selected bibliography is to list available, unclassified laminar flow (both controlled and natural) research completed from about 1975 to mid 1982. Some earlier pertinent reports are included but listed separately in the Appendix. Reports listed herein emphasize aerodynamics and systems studies, but some structures work is also summarized. Aerodynamic work is mainly limited to the subsonic and transonic sped regimes. Because wind-tunnel flow qualities, such as free stream disturbance level, play such an important role in boundary-layer transition, much recent research has been done in this area and it is also included.

N82-31707/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Large Displacements and Stability Analysis of Nonlinear Propeller Structures.
R. A. Aiello. 1982, 18p NAS 1.15:82850, NASA-TM-82850
Presented at the 10TH Nastran User's Colloq., New Orleans, 13-14 May 1982.

The use of linear rigid formats in COSMIC NASTRAN without DMAP procedures for the analysis of nonlinear propeller structures is described. Approaches for updating geometry and applying follower forces for incremental loading are demonstrated. Comparisons are made with COSMIC NASTRAN rigid formats and other independent finite element programs. Specifically, the comparisons include results from the four approaches for updating the geometry using RIGID FORMAT 1, RIGID FORMATS 4 and 13, MARC and MSC/NASTRAN. It is shown that 'user friendly' updating approaches (without DMAPS) can be used to predict the large displacements and instability of these nonlinear structures. These user friendly approaches can be easily implemented by the user and predict conservative results.

1B. Aeronautics

AD-A119 406/7 PC **A03**/MF **A01**
Calspan Corp., Buffalo, NY.
Equivalent System Verification and Evaluation of Augmentation Effects on Fighter Approach and Landing Flying Qualities. Volume 1. Summary.
Final rept. Jul 78-Jul 81,
John Hodgkinson, Richard C. Snyder, and Rogers E. Smith. Sep 81, 43p CALSPAN-6241-F-3-VOL-1, AFWAL-TR-81-3116-VOL-1
Contract F33615-78-C-3602

This executive summary reports an analysis of an approach and landing evaluation program using the AFWAL/Calspan NT-33 variable stability aircraft to test the suitability of representing aircraft with complex flight control systems by an equivalent simplified system. An evaluation of the equivalent systems includes effects of time delay, correlations with Pilot Ratings and comparison of frequency response characteristics for both high-order and low-order configurations. Analytical and fast Fourier transform Bode diagrams of the configurations have been plotted with the corresponding step time histories. The effects of gain parameters on the matching of equivalent systems are presented. The resulting response characteristics also serve as a check on the predicted responses as defined by the analytical descriptions programmed in the NT-33. The equivalent systems data have been evaluated with the Neal and Smith closed-loop analysis technique. For the longitudinal evaluations, the validity of the equivalent system approach for evaluation of the flying qualities of complex aircraft was generally verified. The data for the lateral equivalent system evaluations were inconclusive. (Author)

AD-A119 407/5 MF **A01**
Naval Air Development Center, Warminster, PA. Aircraft and Crew Systems Technology Directorate.
A Dive Performance Computer Program.
Final rept.,
David Bruce Kobus. 24 May 82, 72p Rept no. NADC-82012-60
Availability: Microfiche copies only.

A computer program has been developed which is capable of analyzing the dive performance of any general air vehicle configuration. This program can be used to determine if vehicle design critieria can be met under a dive condition. This program was written in FORTRAN VERSION 4.8 LEVEL 518 for use on a CYBER computer and uses four supporting subroutines. This report describes the analytical development and logic development for the program. In addition, it includes a user description and complete listing of the program. (Author)

AD-A119 636/9 PC **A08**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Creation of a Transportable Interactive User Interface for Improved AAA Simulation Computer Program (P001).
Master's thesis,
Eric R. Johns. Jun 82, 172p

The Air Force Armament Laboratory AAA Simulation Computer Program and MICE II have been adapted for batch processing use on the Naval Postgraduate School IBM 3033 computer. To ease data entry and reduce errors, a preprocessor program (PIP) was written at the school. The modifications necessary to convert PIP from a batch program to an interactive one are described herein.

AD-A119 704/5 PC **A16**/MF **A01**
Calspan Corp., Buffalo, NY. Flight Research Dept.
Equivalent System Verification and Evaluation of Augmentation Effects on Fighter Approach and Landing Flying Qualities. Volume 2. Program Plan, Test Data and Analysis.
Final rept. Jul 78-Jul 81,
Rogers E. Smith, John Hodgkinson, and Richard C. Snyder. Sep 81, 375p CALSPAN-6241-F-3-VOL-2, AFWAL-TR-81-3116-VOL-2
Contract F33615-78-C-3602
See also Volume 1, AD-A119 406.

An approach and landing evaluation program was performed using the AFWAL/Calspan NT-33 variable stability aircraft to test the suitability of representing aircraft with complex flight control systems by an equivalent simplified system. An evaluation of the equivalent systems includes effects of time delay, correlation with Pilot Ratings and comparison of frequency response characteristics for both high order and low order configurations. The analytical descriptions of the configurations have been plotted in Bode diagrams with the corresponding step time histories. The effects of gain parameters on the matching equivalent systems are presented. A fast Fourier Transform method has been applied to flight time histories for analysis in the frequency response mode. The resulting response characteristics also serve as a check on the predicted responses as defined by the analytical descriptions programmed in the NT-33. The equivalent systems data have been evaluated with the Neal and Smith closed-loop analysis technique. For the longitudinal evaluations, the validity of the equivalent system approach for evaluation of the flying qualities of complex aircraft was generally verified. The data for the lateral equivalent system evaluations were inconclusive. (Author)

N82-31333/9 PC **A03**/MF **A01**
Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (Germany, F.R.)
Description of a Simple Model to Determine Landing Gear Forces During the Takeoff of Aerodynamically Unstable Aircraft Beschreibung Eines Einfachen Modells Zur Ermittlung von Fahrwerkskraeften Waehrend des Startvorgangs Eines Aerodynamisches Instabilen Flugzeugs.
M. Soelter. 25 Nov 81, 43p EX-228
Text in German.

A simple model to simulate the lateral motion during the takeoff of an aerodynamically unstable aircraft is presented. By neglecting the landing gear dynamics no additional solution of the corresponding differential equations was required. Landing gear forces were determined from the geometrical ratios of the aircraft to the ground reference line. This procedure is particularly efficient when no high frequency landing gear driveas, e.g., during touchdown has to be taken into account. The objection free function of the control concept for an aircraft aerodynamically unstable in the lateral plane is shown.

PAT-APPL-6-387 649 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cocoa Beach, FL. John F. Kennedy Space Center.
Inflight IFR Procedures Simulator.
Patent Application,
L. C. Parker. Filed 11 Jun 82, 22p N82-29331/7, NASA-CASE-KSC-11218-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An in-flight trainer designed to train students in a conventional aircraft is disclosed. The trainer generates simulated signals and commands to conventional instruments provided in the aircraft that correspond to the normal signals a pilot receives during instrument flight rule (IFR) flights and landing and departure procedures. Results of studies conducted using apparatus which demonstrated the concept indicate that the concept is feasible. Also, students trained using only the In-flight IFR Simulator were more proficient in skills development than those trained using table-top simulators and in aircraft in the conventional manner.

PB83-113613 PC **A15**
Federal Aviation Administration, Washington, DC. Office of Management Systems.
Airport Activity Statistics of Certificated Route Air Carriers - 12 Months Ending December 31, 1981.
Annual rept.
31 Dec 81, 349p
See also AD-A089748. Prepared in cooperation with Civil Aeronautics Board, Washington, DC.

This report furnishes airport activity of the Certificated Route Air Carriers. Included in the data contained in Table 6 are passenger enplanements, tons of enplaned freight, express, and mail. Both scheduled and non-scheduled service, and domestic and international operations are included. These data are shown by airport and carrier. Table 7 includes departures by airport, carrier and type of operation, and type of aircraft.

1C. Aircraft

AD-A119 399/4 PC **A03/MF A01**
Naval Surface Weapons Center, Silver Spring, MD.
Polyurethane Foams for Aircraft Shock Mounts. IV. Other Polyols.
Final rept. Jul 80-Sep 81,
James V. Duffy. Jun 82, 29p NSWC/TR-82-176, SBI-AD-F500 070
See also report dated Jul 81, AD-A104 496.

A number of polyether polyurethane flexible foams are being developed as shock mitagators for electronic equipment aboard Navy aircraft. These foams are based on polyol mixtures derived from poly(oxytetramethylene) glycol and poly(oxypropylene)polyol. This report describes the effect that changes in the basic polyol composition has on the foam's vibration damping and mechanical properties.

AD-A119 408/3 PC **A05/MF A01**
Dayton Univ., OH. Research Inst.
A Model for Prediction Bird and Ice Impact Loads on Structures.
Interim rept. 1 Oct 77-31 Nov 79,
Louis I. Boshman, and Antonios Challita. May 82, 96p UDR-TR-79-54, AFWAL-TR-82-2046
Contract F33615-77-C-5221

This report describes a loading model for computation of the pressure distribution exerted on surfaces during bird and ice impacts. Bird and ice impacts are considered as fluid dynamic in nature and are modeled as fluid jets impinging on arbitrarily shaped three dimensional deformable surfaces. A quasi-steady, potential flow analysis is applied to the jet impact problem thereby reducing the impact problem to the problem of solving Laplace's equation. The surface singularity technique is used to solve Laplace's equation. A computer program for computing pressure distributions on both rotating and non-rotating turbine engine components is both rotating and non-rotating turbine engine components is described. A model for treating slicing of birds and ice by rotating blades is incorporated into this computer program. The loading model computer program is specifically developed to be interfaced with finite-element structural analysis computer programs. Given the instantaneous impacted surface shape and displacement velocity the loading model computer program computes the pressure distribution existing on the impacted surface. The shape of the impact surface is fed to the loading model in the loading model in the form of finite element surface nodal computer program constructs a system of quadrilateral elements covering the impacted surface. The shape of the impact surface is fed to the loading model in the form of finite element surface nodal point coordinates. From this information, the loading model computer program constructs a system of quadrilateral elements covering the impacted surface.

AD-A119 412/5 PC **A03/MF A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Toward a Better Understanding of Helicopter Stability Derivatives.
Technical memo.,
Raymond S. Hansen. Aug 82, 27p NASA-A-9028, NASA-TM-84277, USAAVRADCOM-TR-82-A-12

An amended six-degree-of-freedom helicopter stability and control derivative model was developed in which body acceleration and control-rate derivatives were included in the Taylor series expansion. These additional derivatives were derived from consideration of the effects of the higher-order rotor-flapping dynamics, which are known to be inadequately represented in the conventional six-degree-of-freedom, quasi-static stability-derivative model. The amended model was found to be a substantial improvement over the conventional model, effectively doubling the usable bandwidth and providing a more accurate representation of the short-period and cross-axis characteristics. Further investigations assessed the applicability of the two stability-derivative model structures for flight-test parameter identification. Parameters were identified using simulation data generated from a higher-order base-line model having sixth-order rotor tip-path-plane dynamics. Three lower-order models were identified: one using the conventional stability-derivative model structure, a second using the amended six-degree-of-freedom model structure, and a third model having eight degrees of freedom that included a simplified rotor tip-path-plane tilt representation. (Author)

AD-A119 421/6 PC **A12/MF A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
Background Information and User Guide for MIL-F-8785C, Military Specification - Flying Qualities of Piloted Airplanes.
Interim rept. May 77-May 81,
David J. Moorhouse, and Robert J. Woodcock. Jul 82, 255p Rept no. AFWAL-TR-81-3109
See also AD-860 856.

This document is published in support of Military Specification MIL-F-8785C, Flying Qualities of Piloted Airplanes. It was compiled after an extensive literature review and meetings and discussions with personnel from concerned civilian and governmental organizations. The primary purpose is to explain the revisions from MIL-F-8785B and present substantiating data. (Author)

AD-A119 504/9 PC **A02/MF A01**
Naval Facilities Engineering Command, Alexandria, VA.
Aircraft Fire and Rescue Training Facilities. Design Manual 27.5.
Final rept.
Feb 80, 23p Rept no. NAVFAC-DM-27.5

Criteria are presented herein for the design of a smoke-abated, aircraft crash and rescue, fire training facility. A newly-developed water spray system provides for the abatement of smoke generated in the hot-fire trainer during the fire training exercise. Contaminated waste water is collected in tankage for appropriate disposal. The design includes a fuel system with nozzle outlets for delivering gasoline or JP-4 to the hot-fire trainer. The use of less volatile fuels will not provide for adequate fuel smoke abatement during the ignition phase. Supplementary mock up training aids, required for a complete training facility, are not provided in this document. This information will be available in separate documents. (Author)

AD-A119 543/7 PC **A03/MF A01**
Aeronautical Research Labs., Melbourne (Australia).
A Set of Flight Dynamic Equations for Aircraft Simulation.
Technical memo.,
P. H. Hall. Jun 82, 26p Rept no. ARL/AERO-TM-339

The six degrees of freedom dynamic equations of aircraft motion are documented for use in aircraft simulations at ARL. Earth axes are chosen for the integration of the force equations, and body axes for the integration of the moment equations. The use of quaternions to calculate aircraft attitude and associated direction cosines is described. A brief description of an atmospheric data subroutine for use in aircraft simulation is also included. (Author)

AD-A119 545/2 PC **A03/MF A01**
Aeronautical Research Labs., Melbourne (Australia).
Procedure for Application of Boron-Fibre Reinforced Plastic Patch to the Mirage Lower Wing Skin Fuel Decant Region.
Technical memo.,
M. J. Davis, and J. D. Roberts. Aug 81, 38p Rept no. ARL/MAT-TM-373

Aeronautical Research Laboratories have developed a new procedure for the repair of metallic aircraft components suffering from cracking due to fatigue or stress-corrosion; the procedure is based on the use of patches made from Boron-Fibre Reinforced Plastic which are adhesively bonded over the crack region. Crack patching using this technique has been successfully used in a number of repair applications on RAAF aircraft since 1975, and has been shown to be highly cost effective and also to have many other advantages over standard repair procedures. More recently, a 'crack patching' procedure was developed by ARL to repair fatigue cracks which have developed in the lower wing skins of some RAAF Mirage aircraft. Since this was a much more critical and complex application than any previously undertaken, involving the use of specially developed ground support equipment, a detailed specification was written as a guide for RAAF personnel, who were trained to implement the repair; this specification is presented in this Memorandum. (Author)

AD-A119 551/0 PC **A04/MF A01**
Air Force Flight Test Center, Edwards AFB, CA.
Development of Curves for Estimating Aircraft Arresting Hook Loads.
Final rept.,
Lyle W. Jones. Jul 82, 72p Rept no. AFFTC-TIM-81-3

This Technical Information Memorandum was written to provide AFFTC engineers with a reliable, accurate method for predicting maximum aircraft arresting hook loads based on a knowledge of aircraft weight and groundspeed at the moment of cable engagement. Possible causes of excessive data dispersion are discussed and guidelines for minimizing dispersion are provided. Families of curves relating hook load and groundspeed which fit BAK-12ER and BAK-13 arresting system test data are derived and confidence intervals are applied. The information provided in this TIM will be of interest to those involved with the design, fabrication, testing and/or operation of aircraft arresting systems. (Author)

AD-A119 559/3 PC **A15/MF A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Advanced Avionics and the Military Aircraft Man/Machine Interface.
Conference proceedings.
Jul 82, 342p Rept no. AGARD-CP-329
Presented at the Meeting of the Avionics Panel, 26-29 Apr 82, Blackpool, UK. Text in English and French.

These Proceedings consist of the papers and discussions presented at the Avionics Panel Meeting on 'Advanced Avionics and the Military Aircraft Man/Machine Interface' held in Blackpool, England, 26-29 April 1982. The 30 papers presented were divided as follows: three were introductory, 5 were on Colour Display Systems, 9 were on Voice Input and Output Systems, 6 were on Aircrew Interaction with Complex Systems, and 7 were on Display Technology. The Proceedings also include a Technical Evaluation Report of the Meeting. (Author)

AD-A119 560/1 PC **A02/MF A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Technical Evaluation Report on the AGARD Fluid Dynamics Panel Symposium on Fluid Dynamics of Jets with Applications to V/STOL.
Advisory rept.,
B. M. Spee. Jul 82, 13p Rept no. AGARD-AR-187
See also AD-A113 907.

This report presents an evaluation of the papers presented during the AGARD Fluid Dynamics Panel Symposium on Fluid Dynamics of Jets with Applications to V/STOL held 2-5 November in Lisbon, Portugal. General observations on progress in the understanding of the flow phenomena associated with jets are followed by more specific comments related to the five topical sessions of the meeting: Jet Interactions with Neighboring Surfaces, Jet Structure and Development; Windtunnel Simulation of Flow Field, Forces Moments; Injection and Thrust Augmentation; and Theoretical Models and their Assessment. Conclusions and recommendations for further work drawn from the presentations and discussions at the Symposium are included. (Author)

AD-A119 561/9 PC **A03/MF A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Technical Evaluation Report on the Specialists' Meeting on Dynamic Environmental Qualification Techniques.
Advisory rept.,
Howard A. Magrath. Jul 82, 35p Rept no. AGARD-AR-183
See also AD-A112 533.

At the 53rd Meeting of the Structures and Materials Panel of AGARD, a Specialists' Meeting on 'Dynamic Environmental Qualification Techniques' was held on 28-30 September 1981. It was the purpose of the Specialists' Meeting: to review the state-of-the-art of dynamic qualification techniques and test methods presently applied for military aircraft and helicopters, particularly when carrying external stores; to exchange technical information in this field between all NATO countries; to review the background and intentions of related Military Standards publications; and to try to formulate a common basis for dynamic structural requirements and substantiation procedures. In this Technical Evaluation Report, summaries of the 17 papers presented at the Meeting, and published as AGARD CP-318, are given. Some thoughts on these papers are outlined and general suggestions are made with regard to revisions of existing Military Standards and further improvement and standardization of dynamic qualification procedures.

AD-A119 566/8 PC **A02/MF A01**
Aircraft Research and Development Unit, Edinburgh (Australia).
Limited Assessment of Macchi MB-326H Handling Characteristics without Tip Tanks Fitted.
Flight test rept.,
P. L. Sadler. Apr 81, 22p Rept no. ARDU-TN-AERO-73

Aircraft Research and Development Unit identified a requirement for an aircraft which displayed unique handling characteristics. The aircraft is to be used for pre-test pilot course training. A Macchi MB-362H was modified by removing the tip tanks and fitting tip fairings. Flight tests demonstrated that, although the handling characteristics in normal flight were not markedly affected, the better lateral response and increased performance made the modified aircraft more pleasant to fly. Removal of the tip tanks made the aircraft's erect spin much more oscillatory, and on occasions the gyrations were violent. Nevertheless, the aircraft always recovered quickly from the spin when standard spin recovery action was taken. As a result of the changes to the handling characteristics, the modified aircraft could be used to provide pre-test pilot course training. Operating procedures and limitations to be imposed when operating the aircraft in the modified state were also determined during the test programme. (Author)

AD-A119 572/6 PC **A05/MF A01**
Simmonds Precision Products, Inc., Vergennes, VT. Instrument Systems Div.
Commercial Aircraft Airframe Fuel Systems Survey and Analysis.
Final rept. Oct 80-Jun 82,
P. G. Weitz. Jul 82, 98p DOT/FAA/CT-82/80
Contract DTFA03-80-C-0080

A selection of commercial aircraft airframe fuel systems has been studied to determine areas where incompatibility with antimisting kerosene fuel (AMK) may exist. Incompatibility can be due to reduced fuel system component performance with AMK or shear degradation of the AMK by the fuel system components. Survey results, to date, indicate that potential component performance problems with AMK are more significant than loss of AMK flammability protection due to shear degradation. Components of interest include ejector pumps, fuel filters, and auxiliary power units. (Author)

AD-A119 580/9 PC **A08/MF A01**
Naval Postgraduate School, Monterey, CA.
HP-41CV Flight Performance Advisory System (FPAS) for the E-2C, E-2B, and C-2A Aircraft.
Final technical rept. Apr-Jun 82,
Dennis R. Ferrell. Jun 82, 153p Rept no. NPS67-82-003

This report describes follow-on work performed under the auspices of AE 4900, Directed Studies in Aeronautical Engineering at the Naval Postgraduate School, to complement the original design of a Flight Performance Advisory System (FPAS) for the E-2C aircraft. The original design fulfilled the requirements of AE 3001, Aircraft Energy Conservation. AE 3001, offered in the Fall Quarter 1981, and conducted by Professor Allen E. Fuhs, was sponsored in part by the Naval Air Development Center (NADC). NADC desired to obtain the input of several fleet experienced aviators in order to design program code for the HP-41CV handheld, programmable calculator that would benefit pilots by providing them with fuel efficiency parameters in flight. Calculators were made available to the participants with the proviso that a completed and operable code for each aircraft be submitted by the end of the academic quarter, September 1981. Upon completion of the E-2C program, attempts were made to use the calculator in flight. One test was conducted informally in an E-2C at RVAW-110, NAS Miramar. Unfortunately, the voltage field induced in the cockpit by the main lobe of the radar passing over the cockpit caused the calculator to cease functioning. The need to devise shielding for the calculator, plus the desire to simplify and improve the existing code lead to this effort.

AD-A119 612/0 PC **A03/MF A01**
Molusis (John A.), Ashford, CT.
Rotorcraft Blade Mode Damping Identification from Random Responses Using a Recursive Maximum Likelihood Algorithm.
Contractor rept.,
John A. Molusis. Sep 82, 50p NASA-CR-3600

An on-line technique is presented for the identification of rotor blade modal damping and frequency from rotorcraft random response test data. The identification technique is based upon a recursive maximum likelihood (RML) algorithm, which is demonstrated to have excellent convergence characteristics in the presence of random measurement noise and random excitation. The RML technique requires virtually no user interaction, provides accurate confidence bands on the parameter estimates, and can be used for continuous monitoring of modal damping during wind tunnel or flight testing. Results are presented from simulation random response data which quantify the identified parameter convergence behavior for various levels of random excitation. The data length required for acceptable parameter accuracy is shown to depend upon the amplitude of random response and the modal damping level. Random response amplitudes of 1.25 degrees to .05 degrees are investigated. The RML technique is applied to hingeless rotor test data from the NASA Langley Research Center Helicopter Hover Facility. The inplane lag regressing mode is identified at different rotor speeds. The identification from the test data is compared with the simulation results and with other available estimates of frequency and damping. (Author)

AD-A119 627/8 PC **A04/MF A01**
Bendix Corp., Teterboro, NJ. Flight Systems Div.
Advanced Flight Control Actuation System (AFCAS - E/P). Fabrication and Design Verification Testing of a Dual Mode Electro/Pneumatic Actuator for the T-2C Aircraft.
Final rept. Sep 78-Apr 81,
Wallace Kineyko. Apr 82, 55p NADC-82047-60
Contract N62269-78-C-0247

Report of the fabrication and design verification testing of a Dual Mode Electro/Pneumatic Actuator. Pneumatic model open loop operation and control verified. Torque/Speed performance less than design goal due to excessive gear separation force. (Author)

AD-A119 637/7 PC **A12/MF A01**
Naval Postgraduate School, Monterey, CA.
Dynamic Stability of Flight Vehicles.
Master's thesis,
Dimitrios Panagiotis Pouliezos. Jun 82, 257p

The thesis presents an analytical treatment of the dynamics of the flight vehicle and might be used as a textbook for a Dynamic Stability and Control advanced class. Concentration is given to derivation of equations of motion, investigation of particular modes of motion, stability derivatives, aerodynamic transfer functions and digital computer solutions. (Author)

AD-A119 683/1 Not available NTIS
Illinois Univ. at Urbana-Champaign. Dept. of Aeronautical and Astronautical Engineering.
Rotor Blade Flap-Lag Stability in Turbulent Flows.
J. E. Prussing, and Y. K. Lin. 1982, 8p ARO-15193.8-EG
Grant DAAG29-78-G-0039
Availability: Pub. in Jnl. of American Helicopter Society, p51-57 Apr 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 684/9 Not available NTIS
Illinois Univ. at Urbana-Champaign. Dept. of Aeronautical and Astronautical Engineering.
Concepts of Stochastic Stability in Rotor Dynamics.
Y. K. Lin, and J. E. Prussing. 1982, 3p ARO-17830.2-EG
Contract DAAG29-81-K-0072
Availability: Pub. in Jnl. of American Helicopter Society, p73-74 Apr 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 764/9 PC **A06/MF A01**
Pisa Univ. (Italy). Ist. di Aeronautica.
The Fatigue Crack Growth under Variable Amplitude Loading in Built-up Structures.
Final technical rept. Sep 78-Feb 82,
A. Salvetti, G. Cavallini, and L. Lazzeri. Apr 82, 124p
Grant DA-ERO-78-G-107

Seventy-four specimens, made of 2024-T3 aluminum alloy, were tested both at constant and variable amplitude loading. The specimens were both simple sheets and riveted stiffened panels. The constant amplitude tests on simple sheet specimens were conducted in order to obtain the average K-rate relationship and the relevant scatter of the batch of sheets. The constant amplitude tests of stiffened panels aimed at obtaining information on the overall junction flexibility. Variable amplitude tests were performed utilizing three standard fatigue spectra, like FALSTAFF, MINITWIST, and Gaussian random. The data from sheet specimens was used to assess the reliability of prediction methods such as those devised by Wheeler and Willenborg, and the stiffened panels test data to evaluate how these methods work in the case of built-up structures. Some general conclusions on the reliability of the crack growth prediction methods have been obtained treating on statistical basis the data collected in the current year, as well as in the previous year's research activity. To this end, data from variable amplitude tests, irrespective of the type of spectrum and of the material, has been collected and analyzed in order to evaluate in this respect the methods proposed by Willenborg and by Wheeler. The results are quite interesting, because they allow to evaluate the scatter associated with most of the parameters involved in crack growth predictions.

AD-A119 765/6 PC **A05/MF A01**
Naval Postgraduate School, Monterey, CA.
The AV-8B Decision.
Master'S thesis,
Joel L. Goza. Jun 82, 96p

This thesis is a case study of the debate over the decision of the United States Government to procure the McDonnell Douglas AV-8B Advanced Harrier V/STOL jet aircraft for the U.S. Marine Corps. It includes a history of the development of the AV-8A Harrier, the development of the Marine Corps' concept of employment of V/STOL aircraft, and the development of the AV-8B. The study centers around the actions taken by the Office of the Secretary of Defense, the Department of the Navy, the U.S. Navy, the U.S. Marine Corps, and the Congress of the United States in the controversy over the AV-8B during the period 1977-1980. That controversy was over the decision to equip the Marine light attack force during the 1980's with either the AV-8B Advanced Harrier on the A-18 Hornet to replace worn-out A-4M Skyhawks and AV-8A Harriers. The thesis follows both sides of the argument over the AV-8B in the context of the PPBS process, the President's budget process, and the Major System Acquisition process. (Author)

N82-31294/3 PC **A03/MF A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.

Noise and Economic Characteristics of an Advanced Blended Supersonic Transport Concept.
J. K. Molloy, W. D. Grantham, and M. J. Neubauer, Jr., Sep 82, 32p NAS 1.60:2073, L-15297, NASA-TP-2073

Noise and economic characteristics were obtained for an advanced supersonic transport concept that utilized wing body blending, a double bypass variable cycle engine, superplastically formed and diffusion bonded titanium in both the primary and secondary structures, and an alternative interior arrangement that provides increased seating capacity. The configuration has a cruise Mach number of 2.62, provisions for 290 passengers, a mission range of 8.19 Mm (4423 n.mi.), and an average operating cruise lift drag ratio of 9.23. Advanced operating procedures, which have the potential to reduce airport community noise, were explored by using a simulator. Traded jet noise levels of 105.7 and 103.4 EPNdB were obtained by using standard and advanced takeoff operational procedures, respectively. A new method for predicting lateral attenuation was utilized in obtaining these jet noise levels.

N82-31311/5 PC **A04/MF A01**
Virginia Univ., Charlottesville. Dept. of Mechanical Engineering.
Identification of Terms to Define Unconstrained Air Transportation Demands.
Final Report, 26 Mar. 1980 - 31 Aug. 1981.
I. D. Jacobson, and A. R. Kuhlhau. Apr 82, 60p NAS 1.26:165961, UVA/528194/MAE-CE82/101, NASA-CR-165961
Contract NAS1-14908

The factors involved in the evaluation of unconstrained air transportation systems were carefully analyzed. By definition an unconstrained system is taken to be one in which the design can employ innovative and advanced concepts no longer limited by present environmental, social, political or regulatory settings. Four principal evaluation criteria are involved: (1) service utilization, based on the operating performance characteristics as viewed by potential patrons; (2) community impacts, reflecting decisions based on the perceived impacts of the system; (3) technological feasibility, estimating what is required to reduce the system to practice; and (4) financial feasibility, predicting the ability of the concepts to attract financial support. For each of these criteria, a set of terms or descriptors was identified, which should be used in the evaluation to render it complete. It is also demonstrated that these descriptors have the following properties: (a) their interpretation may be made by different groups of evaluators; (b) their interpretations and the way they are used may depend on the stage of development of the system in which they are used; (c) in formulating the problem, all descriptors should be addressed independent of the evaluation technique selected.

N82-31321/4 PC **A04/MF A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Experimental Investigation of Active Loads Control for Aircraft Landing Gear.
J. R. Mcgehee, and R. C. Dreher. Aug 82, 72p NAS 1.60:2042, L-15224, NASA-TP-2042

Aircraft dynamic loads and vibrations resulting from landing impact and from runway and taxiway unevenness are recognized as significant in causing fatigue damage, dynamic stress on the airframe, crew and passenger discomfort, and reduction of the pilot's ability to control the aircraft during ground operations. One potential method for improving operational characteistics of aircraft on the ground is the application of active control technology to the landing gears to reduce ground loads applied to the airframe. An experimental investigation was conducted which simulated the landing dynamics of a light airplane to determine the feasibility and potential of a series hydraulic active control main landing gear. The experiments involved a passive gear and an active control gear. Results of this investigation show that a series hydraulically controlled gear is feasible and that such a gear is very effective in reducing the loads transmitted by the gear to the airframe during ground operations.

N82-31330/5 PC **A06/MF A01**
Drexel Univ., Philadelphia, PA. Dept. of Mechanical Engineering and Mechanics.
Singular Perturbation Techniques for Real Time Aircraft Trajectory Optimization and Control.
Final Report, Feb. 1978 - Dec. 1981.
A. J. Calise, and D. D. Moerder. Aug 82, 111p NAS 1.26:3597, NASA-CR-3597
Grant NSG-1496

The usefulness of singular perturbation methods for developing real time computer algorithms to control and optimize aircraft flight trajectories is examined. A minimum time intercept problem using F-8 aerodynamic and propulsion data is used as a baseline. This provides a framework within which issues relating to problem formulation, solution methodology and real time implementation are examined. Theoretical questions relating to separability of dynamics are addressed. With respect to implementation, situations leading to numerical singularities are identified, and procedures for dealing with them are outlined. Also, particular attention is given to identifying quantities that can be precomputed and stored, thus greatly reducing the onboard computational load. Numerical results are given to illustrate the minimum time algorithm, and the resulting flight paths. An estimate is given for execution time and storage requirements.

N82-31448/5 PC **A07/MF A01**
Douglas Aircraft Co., Long Beach, CA.
Kevlar/Pmr-15 Reduced Drag DC-9 Reverser Stang Fairing.
R. T. Kawai. Aug 82, 140p NAS 1.26:165448, NASA-CR-165448
Contract NAS3-21763

A reduced drag fairing for the afterbody enclosing the thrust reverser actuators on the DC-9 has been developed with Kevlar-49/PMR-15 advanced composite material. The improved fairing reduces airplane drag 1% compared to the production baseline. Use of composites reduces weight 40% compared to an equivalent metal fairing. The Kevlar-49/PMR-15 advanced composite is an organic matrix material system that can be used at temperatures up to 500 F.

N82-31569/8 PC **A03/MF A01**
Southampton Univ. (England).
Activities of the Institute of Sound and Vibration Research.
Annual Report, Mar. 1982.
1982, 49p

Research in fluid dynamics, acoustics, automotive engineering, audiology, noise and vibration effects (on human beings), and structural response to noise and vibration was carried out. Aircraft noise, acoustics of flow duct systems and enclosures, acoustic modeling, sound propagation, and acoustic measurement techniques were studied. Auditory and vestibular functions and electrophysiology were investigated.

N82-31891/6 PC **A02/MF A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Biocorrosion,
G. Dallemagne. 1982, 14p SNIAS-821-551-105, DCQ/L-160.390/82
Text in French. Presented at Ecole Natl. Super. De Chim. Ecole d'Ete sur Corrosion et Protection des Metaux, les Houches, France, Sep. - Oct. 1981.

Microorganisms which cause biocorrosion, factors which favor their development, and detection and treatment of biocorrosion are discussed. It is impossible to eradicate traces of water, in which the organisms develop, from contaminating fuel tanks, so fuel should be kept as free of water as possible. Synthetic liners which inhibit organism growth, and which are chemically resistant to water and jet fuel are suggested. It is possible that potassium bichromate, and boron compounds are good fungicides and bactericides.

N82-31965/8 PC **A10/MF A01**
United Technologies Corp., Stratford, CT. Sikorsky Aircraft Div.
Coupled Rotor/Airframe Vibration Analysis Program Manual Manual. Volume 1: User's and Programmer's Instructions.
Final Report.
S. Cassarino, and R. Sopher. Jun 82, 212p NAS 1.26:165891, NASA-CR-165891
Contract NAS1-16058
Sponsored in Part by Army.

user instruction and software descriptions for the base program of the coupled rotor/airframe vibration analysis are provided. The functional capabilities and procedures for running the program are provided. Interfaces with external programs are discussed. The procedure of synthesizing a dynamic system and the various solution methods are described. Input data and output results are presented. Detailed information is provided on the program structure. Sample test case results for five representative dynamic configurations are provided and discussed. System response are plotted to demonstrate the plots capabilities available. Instructions to install and execute SIMVIB on the CDC computer system are provided.

N82-31966/6 PC **A12/MF A01**
United Technologies Corp., Stratford, CT. Sikorsky Aircraft Div.
Coupled Rotor/Airframe Vibration Analysis Program Manual. Volume 2: Sample Input and Output Listings.
Final Report.
S. Cassarino, and R. Sopher. Jun 82, 263p NAS 1.26:165892, NASA-CR-165892
Contract NAS1-16058
Sponsored in Part by Army.

Sample input and output listings obtained with the base program (SIMVIB) of the coupled rotor/airframe vibration analysis and the external programs, G400/F389 and E927 are presented. Results for five of the base program test cases are shown. They represent different applications of the SIMVIB program to study the vibration characteristics of various dynamic configurations. Input and output listings obtained for one cycle of the G400/F389 coupled program are presented. Results from the rotor aeroelastic analysis E927 also appear. A brief description of the check cases is provided. A summary of the check cases for all the external programs interacting with the SIMVIB program is illustrated.

N82-32081/3 PC **A03/MF A01**
California Univ., Los Angeles.
Aerosound from Corner Flow and Flap Flow.
W. C. Meecham. Jul 82, 41p NAS 1.26:166396, NASA-CR-166396
Contract NAS2-10590
Prepared in Cooperation with Mechanics Development CO., Pacific Palisades, Calif.

Noise generation at the edge of a wing flap is analyzed. The phenomenon as a single vortex moving around a corner in an incompressible, potential flow is modelled. Vortex image retarding effects are proposed as an explanation for small Strouhal numbers. The model surface pressures, sound pressures (using Curle's theory), and Mach number dependencies agree with wind tunnel experiments. A double pressure peak is found in the model (credited to image action) which is qualitatively similar to measured sound correlations. Incompressible flow aerosound calculations are discussed. The effects of a series of vortices moving in the same idealized potential flow are also studied. The vortices are assumed to be statistically independent so their intensities can be added. The frequency of appearance of the vortices are determined from measurements. Diffraction effects caused by the presence of the wing near the dipole sound radiators on the flap surfaces are included.

N82-32082/1 PC **A02/MF A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Rough Analysis of Installation Effects on Turboprop Noise.
P. A. Durbin, and J. F. Groeneweg. 1982, 17p NAS 1.15:82924, E-1316, NASA-TM-82924
Proposed for Presentation at the Acoust. Soc. Of AM., Orlando, Fla., 8-12 Nov. 1982.

A rough analysis of noise from a propeller operated at angle of attack, and in the nonuniform flow due to a line vortex approximating a wing flow field suggests installation can significantly affect turboprop noise leveles. On one side of the propeller, where the blades approach the horizontal plane from above, decreases of noise occur; while on the other side noise increases. The noise reduction is due to negative interference of steady and unsteady sources. An angle of attack, or distance between propeller and vortex, exists for which noise is a minimum.

PAT-APPL-6-393 834 PC **A02/MF A01**
Department of the Air Force, Washington, DC.

Translating Rudder Pedal System.
Patent Application,
George W. Larson. Filed 30 Jun 82, 16p AD-D009 708/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The patent application relates to a translating rudder pedal system which includes a rudder pedal assembly and a reclinable, translationally moveable, seat operably connected to the pedal assembly, with both the pedal assembly and the seat mounted in a vehicle, such as an aircraft. The system ensures that, irrespective of the movement and positioning of the seat, the feet of the user seated in the seat always remain in contact with the control pedals of the rudder pedal assembly. (Author)

PATENT-4 313 291 Not available NTIS
National Aeronautics and Space Administration, Cocoa Beach, FL. John F. Kennedy Space Center.
Method for Refurbishing and Processing Parachutes.
Patent,
R. T. Crowell. Filed 30 May 80, patented 2 Feb 82, 7p N82-29330/9, PAT-APPL-6-154 663
Supersedes PAT-APPL-6-154 663, N81-14967 (19 - 06, p 0706).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A system and method for refurbishing and processing parachutes is discussed including an overhead monorail conveyor system on which the parachute is suspended for horizontal conveyance. The parachute is first suspended in partially open tented configuration wherein open inspection of the canopy is permitted to remove debris and inspect all areas. Following inspection, the parachute is transported by the monorail conveyor to a washing and drying station with the parachute canopy mounted on the conveyor ina systematic arrangement which permits water and air to pass through the ribbonlike material of the canopy. Following drying of the parachute, the parachute is conveyed into an interior space where it is finally inspected and removed from the monorail conveyor and laid upon a table for folding.

PB83-110585 PC **A04/MF A01**
Office of Technology Assessment, Washington, DC.
Impact of Advanced Air Transport Technology. Part IV: Financing and Program Alternatives for Advanced High-Speed Aircraft. Background Paper.
Aug 82, 52p OTA-BP-T-14
See also PB82-186800.

This background paper examines the potential financial and managerial barriers to carrying out a large-scale program to create a new, long-range commercial air transport employing new technology. It evaluates the risks inherent in such a program and describes the structure and financing practices of the conventional aircraft industry. It is the fourth and final segment of a broad assessment of the economic, environmental, energy, societal, and safety aspects of technological advances that might occur in several types of transport aircraft. Specifically, it supplements the earlier OTA report, 'Impacts of Advanced Air Transport Technology: Part I–Advanced High-Speed Aircraft'.

PB83-113522 PC **A04/MF A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
An Assessment of Correlations between Laboratory and Full-Scale Experiments for the FAA Aircraft Fire Safety Program. Part 1: Smoke,
James G. Quintiere. Jul 82, 54p NBSIR-82-2508, DOT/FAA/CT-82/100
See also Part 2, PB83-113530.

An extensive review is presented demonstrating the nature of comparison between full-scale fire smoke data and test method results for materials. These correlations are presented in terms of consistent parameters established through a development of the governing equations for smoke concentration and light attenuation. Visibility data pertaining to light transmission through smoke is presented but no general results exist on the sensory irritant effect of smoke on vision. Analysis shows the complex dependence of smoke production on many parameters acting in fire growth and shows the futility and nature of simple correlation attempts. Recommendations are made for further research to establish a sounder basis for correlations, and a practical strategy is suggested for proceeding in the present.

PB83-113530 PC **A02/MF A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
An Assessment of Correlations between Laboratory and Full-Scale Experiments for the FAA Aircraft Fire Safety Program. Part 2: Rate of Energy Release in Fire,
James G. Quintiere. Jul 82, 25p NBSIR-82-2536, DOT/FAA/CT-82/108
See also Part 1, PB83-113522.

The rate of energy release in fire is discussed. The significance of calorimetric measurements of energy release for materials is related to thermal-dynamic parameters, namely heat of reaction and stoichiometric coefficients. It is shown that a common set of parameters is necessary to express ignition, flame spread and mass loss due to combustion and heat transfer in fires. The relationship of ignition and flame spread to rate of energy release in fires is presented along with a presentation on upward spread.

PB83-113548 PC **A03/MF A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
An Assessment of Correlations between Laboratory and Full-Scale Experiments for the FAA Aircraft Fire Safety Program. Part 4: Flammability Tests,
James G. Quintiere. Jul 82, 28p NBSIR-82-2525, DOT/FAA/CT-82/101
See also Part 2, PB83-113530.

A review is made of studies in which full-scale fire growth was compared with laboratory test data on materials. Both room and corridor fires are included in which primarily interior lining materials have been the combustible element. The studies include standard test methods and other laboratory devices used in the United States and other countries. An effort was made to intercompare experimental results in a common basis. For example, maximum room temperature data are compared with ASTM E-84 flame spread classifications for several full-scale tests which involved nearly the same room geometries and same fuel arrangements.

PB83-113555 PC **A03/MF A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
An Assessment of Correlations between Laboratory and Full-Scale Experiments for the FAA Aircraft Fire Safety Program. Part 5: Some Analyses of the Post Crash,
James G. Quintiere, and Takeyoshi Tanaka. Jul 82, 27p NBSIR-82-2537, DOT/FAA/CT-82/107
See also Part 4, PB83-113548.

An attempt is made to develop mathematical predictions for various aspects of the dynamics of post-crash aircraft fires. The basis of the analysis is the experimental simulation scenario under study by the FAA. The effects of wind are considered as well as the effect of interior and exterior fires. Suggestions are presented for estimating cabin door flow rates from measured temperatures.

PB83-851964 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Aircraft: Computerized Simulation. June, 1972-October, 1982 (Citations from the NTIS Data Base).
Rept. for Jun 72-Oct 82.
Oct 82, 396p
Supersedes PB80-856578.

This bibliography contains citations concerning computer simulation in the aircraft industry. Design and mathematic modelling of such aircraft technology as avionics, maintenance, aerial warfare, flight control systems, aerodynamic drag, pilot training, and noise pollution are discussed. Military aircraft as well as commercial aircraft applications are included. (This updated bibliography contains 298 citations, 117 of which are new entries to the previous edition.)

1D. Aircraft Flight Control and Instrumentation

N82-31326/3 PC **A08/MF A01**
Analytical Mechanics Associates, Inc., Mountain View, CA.
Functional Design to Support Cdti/Dabs Flight Experiments.
Final Report.
T. Goka. Jul 82, 170p NAS 1.26:165947, NASA-CR-165947
Contract NAS1-16802

The objectives of this project are to: (1) provide a generalized functional design of CDTI avionics using the FAA developd DABS/ATARS ground system as the 'traffic sensor', (2) specify software modifications and/or additions to the existing DABS/ATARS ground system to support CDTI avionics, (3) assess the existing avionics of a NASA research aircraft in terms of CDTI applications, and (4) apply the generalized functional design to provide research flight experiment capability. DABS Data Link Formats are first specified for CDTI flight experiments. The set of CDTI/DABS Format specifications becomes a vehicle to coordinate the CDTI avionics and ground system designs, and hence, to develop overall system requirements. The report is the first iteration of a system design and development effort to support eventual CDTI flight test experiments.

N82-31967/4 PC **A06/MF A01**
Illinois Univ., Urbana. Coordinated Science Lab.
Multilevel Semantic Analysis and Problem-Solving in the Flight Domain.
Final Report, 11 Jul. 1981 - 10 Jul. 1982.
R. T. Chien, D. C. Chen, W. P. C. Ho, and Y. C. Pan. Aug 82, 111p NAS 1.26:169282, T-117, NASA-CR-169282
Contract NCC1-52

A computer based cockpit system which is capable of assisting the pilot in such important tasks as monitoring, diagnosis, and trend analysis was developed. The system is properly organized and is endowed with a knowledge base so that it enhances the pilot's control over the aircraft while simultaneously reducing his workload.

PAT-APPL-6-383 384 PC **A02/MF A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Heads Up Display.
Patent Application,
H. D. Garner, and W. E. Howell. Filed 28 May 82, 12p N82-29319/2, NASA-CASE-LAR-12630-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A heads up aircraft display which allows the pilot to view the display without diverting his attention from the scene ahead is disclosed. The display is designed for use on propeller driven aircraft comprised of a radially disposed row of lamps embedded in the rear surface of a propeller. Measurements of flight data are made by conventional means and converted into digital signals. These digital signals are applied to graphic generators which control lamp drivers which in turn control lamps through slip rings. The lamps are lit at the appropriate times during each revolution of the propeller to display the flight data in graphic form to the pilot. The combination of graphic generators and radially disposed lamps embedded in an aircraft propeller enables the pilot to view the display without diverting his attention from the scene ahead.

1E. Air Facilities

AD-A119 454/7 Not available NTIS
Federal Aviation Administration Technical Center, Atlantic City, NJ.

ALSTIS - Airport Landside Simulation Model NTIS Version with Eleven (11) Internal Files, Operable on IBM Systems with IBM Version of GPSS-V.
13 Apr 82, Mag tape Rept no. FAA/DF-82/001
Source tape is in EBCDIC character set and can be prepared in 7 or 9 track modes for 1/2 inch tape. Specify character set, track, density and parity. Call NTIS with questions. Available from NTIS, $540.00, includes documentation, AD-A117 602, AD-A117 603, AD-A117 599, AD-A117 600 and AD-A117 601. (No copies furnished by DTIC).

The Airport Simulation Model (ALSIM), available from NTIS as the tape volume ALSTIS, represents the flow of passengers and vehicles through the airport terminal area. This model simulates queueing and service processes at all essential landside facilities. ALSIM uses an input flight schedule to generate transactions representing passenger groups and accompanying visitors in a time-dependent manner. These transactions are directed to simulated facilities by the use of routine functions applicable to passenger types. Flow, occupancy and instantaneous queue length values are produced periodically as simulated time progresses. At the end of the predetermined simulation time period, summary statistics describing queueing and service processes are produced. The model uses random number generation based upon input distributions to produce service times, routing changes and transaction status assignments. A set of runs with altered random number streams are required to provide useable output statistics. Computer run times are dependent upon factors such as airport size, simulated time specified and passenger demand. As an example, ALSIM requires approximately 7 minutes of central processor time on an IBM 370/158 to produce a single simulation run for a 100 gate airport with a traffic load of 20,000 passengers over a three-hour period using one transaction to represent two passenger groups.

AD-A119 713/6 PC **A15/MF A01**
Civil Aeronautics Board, Washington, DC.
Airport Activity Statistics of Certificated Route Air Carriers.
Annual rept.
31 Dec 81, 347p
Prepared in cooperation with Federal Aviation Administration, Washington, DC. Office of Management Systems.

This report furnishes airport activity of the Certificated Route Air Carriers. Included in the data contained in Table 6 are passenger enplanements, tons of enplaned freight, express, and mail. Both scheduled and non-scheduled service, and domestic and international operations are included. These data are shown by airport and carrier. Table 7 includes departures by airport, carrier and type of operation, and type of aircraft. (Author)

PB83-110023 PC **A03/MF A01**
Public Technology, Inc., Washington, DC.
Airport Access.
Information bulletin.
Jan 80, 26p DOT-I-80-18

This bulletin is a review of problems associated with airport terminal access, and innovative local and federal programs dealing with them. Better procedures for organization in terminal operations, and techniques to improve terminal access impacts on local communities are suggested.

2. AGRICULTURE

2B. Agricultural Economics

PB83-100057 PC **A05/MF A01**
Economic Research Service, Washington, DC. International Economics Div.
Structural and Commodity Policies of Spanish Agriculture,
David R. Kelch. Sep 82, 92p FAER-174

Spain's prospective entry into the European Community has led to Spanish adoption of EC measures to increase agricultural efficiency, augment farm incomes, create more family farms, and reduce rural unemployment. Trade liberalization in agriculture has spurred imports of inputs crucial to agricultural growth. Agricultural policies emphasizing expansion of irrigation and consolidation of farmland have led to more intensive use of the land. Commodity policies have encouraged the intensive feeding of livestock and the substitution of feed grain and oilseed crops for food grain crops.

PB83-103671 PC **A08/MF A01**
Economic Research Service, Washington, DC. National Economics Div.
Livestock and Meat Statistics: Supplement for 1981.
Oct 82, 169p SB-522
See also PB82-120361.

The latest available data on the number, movement, slaughter, and prices of cattle and calves, hogs, poultry, and sheep and lambs are reported for 1980 and 1981. Data also are reported for foreign trade, storage, and processing of livestock and livestock products.

PB83-106591 PC **A07/MF A01**
Economic Research Service, Washington, DC. National Economics Div.
Consumer Demand for Red Meats, Poultry, and Fish.
Staff rept.,
Richard C. Haidacher, John A. Craven, Kuo S. Huang, David M. Smallwood, and James R. Blaylock. Sep 82, 140p AGES-820818

Red meats, poultry, and fish are the most important foods in most consumers's diets, and are of major importance to the Nation's agricultural economy. This report contains evidence that the U.S. demand structure for red meats, poultry, and fish is characterized by a high degree of stability, and that an overwhelming part of the variation in U.S. demand for these products can be explained by the economic factors of prices and income. Socioeconomic and demographic factors which are important determinants of individual consumer demand patterns are also identified; and their effects are measured, and assessed.

PB83-109991 PC **A02/MF A01**
Agricultural Cooperative Service, Washington, DC.
Pricing Plans for Managing Seasonal Deliveries by Dairy Cooperatives,
K. Charles Ling. Aug 82, 25p ACS/RR-22

Dairy cooperatives incur substantial costs in handling seasonal deliveries. Milk production peaks in spring and bottoms out in fall. Fluid demand is higher in early spring and fall than in summer and winter. The weekly cycle of fluid demand by handlers further complicates the problem of reserve balancing operations. This study analyzes effects of such cyclical fluctuations on cooperatives' hauling and manufacturing costs.

PB83-110940 PC **A03/MF A01**
Economic Research Service, Washington, DC. International Economics Div.
Middle East and North Africa: Review of Agriculture in 1981 and Outlook for 1982,
Michael E. Kurtzig. Sep 82, 44p WAS-27 Suppl-8
See also Supplement 7, PB82-263914.

Agricultural production in the Middle East and North Africa declined by 2 percent in 1981. The drought in Morocco and lower livestock output in Iran and Iraq contributed to the decline. Agricultural output in Turkey and Egypt made only slight gains. Agricultural imports by the region increased by 21 percent to $29 million in 1981. The European Community provided about 30 percent, and the United States and Oceania, each, about 11 percent. The region's agricultural production should rebound in 1982. Still, agricultural imports may increase to a record $33 billion.

PB83-110973 PC **A03/MF A01**
Agricultural Cooperative Service, Washington, DC.
Forestry Cooperatives.
Research rept.,
Donald M. Simon, and Orlin J. Scoville. Aug 82, 31p ACS/RR-25

This study describes organizational structure, functions, and facilities of forestry cooperatives in the United States. It evaluates their economic performance and explores current problem areas and potentials for further development. Cooperative organization provides woodland owners professional forestry assistance in terms of forest management, marketing, and educational activities.

PB83-111740 PC **A10/MF A01**
Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
25 Jaar IWIS-TNO, Afdeling Wageningen - Enkele Voorbeelden van de Toepassing van Statistiek en Informatica bij Landbouwkundig Onderzoek (25 Years IWIS-TNO, Wageningen - A Few Examples of the Application of Statistics and Data Processing in Agricultural Research),
J. de Bree. May 81, 207p
Text in Dutch.

Various research activities carried out by IWIS-TNO (TNO Institute for Mathematics, Data Processing and Statistics) in Wageningen are described. The following subjects are dealt with: The method of Beale and Little, applied to time series in which some observation results are missing; Principal components biplots and alpha and beta diversity; Most probable number and seed selection; Data processing and agricultural research; Agriculture in statistics; Aspects of the analysis of growth curves.

PB83-112599 PC **A03/MF A01**
Foreign Agricultural Service, Washington, DC.
Foreign Agriculture Circular: World Grain Situation/Outlook for 1982/83.
16 Aug 82, 34p FG-26-82

A significant upward revision in estimated U.S. grain production was a major development affecting the 1982/83 world grain outlook. Record U.S. corn production, and a near record wheat crop in spite of reduced sowings compared with last year, will likely mean a further substantial buildup in stocks and yet lower producer and export prices.

PB83-115261 PC **A12/MF A01**
Indian Agricultural Research Inst., New Delhi.
Annual Conference of Agricultural Research Statisticians (2) Held on 29th to 31st March, 1976: Contributed Papers and Proceedings,
R. K. Khosla, and R. S. Khatri. 1976, 274p
See also PB83-115279, and PB83-115287.

The report contains the proceedings of the second annual conference of Agricultural Research Statistics on 29-31 March, 1976, held in New Delhi, India. Various topics covered are: Design and analysis of experiments; Sample surveys; Use of computer in agriculture and animal sciences research; Statistical technique in plant and animal breeding; Teaching of statistics in agricultural institutes and universities; and Research and training facilities and personnel policies.

PB83-115279 PC **A09/MF A01**
Indian Agricultural Research Inst., New Delhi.
Conference of Agricultural Research Statisticians (3) Held on 24th to 26th April, 1979: Abstracts of Contributed Papers and Proceedings,
R. K. Khosla, R. S. Khatri, D. S. Anjeja, S. D. Bal, and D. P. Singh. 1978, 176p
See also PB83-115261, and PB83-115287.

The report contains the proceedings of the third conference of Agricultural Research Statisticians on 24-26th of April, 1978, held in New Delhi, India. The topics covered are: Agriculture and forestry; Livestock and fisheries; Statistics needed for area planning; Data processing and information system; and Statistical personnel and their training.

PB83-115287 PC **A13/MF A01**
Indian Agricultural Research Inst., New Delhi.

Conference of Agricultural Research Statisticians (4) Held on 25th to 27th June 1979: Abstracts of Contributed Papers and Proceedings,
R. K. Khosla, R. S. Khatri, and D. S. Aneja. 1979, 293p

The report contains the proceedings of the fourth conference of Agricultural Research Statistics on 25-27 June, 1979 held in New Delhi, India. The topics covered are: Agricultural statistics in crop sciences and forestry; Agricultural statistics in animal sciences; and Agricultural statistics in fisheries.

PB83-115337 PC **A10**/MF **A01**
Indian Agricultural Research Inst., New Delhi.
Conference of Agricultural Research Statisticans (5) Held on 23rd to 26th December 1980: Contributed Papers and Proceedings,
R. K. Khosla, D. S. Aneja, and Madan Mohan. 1980, 225p
See also PB83-115287.

The report contains the proceedings of the fifth conference of Agricultural Research Statistics on 23-26th December, 1980, held in New Delhi, India. The broad topics covered are: Current statistical research in Agricultural; Forestry; Livestock; and Fishery with respect to rural development.

2C. Agricultural Engineering

PB83-110957 PC **A04**/MF **A01**
Illinois Univ. at Urbana-Champaign.
Toward Instream Water Quality Management
Final rept. Sep 77-Aug 79,
C. Osteen, W. D. Seitz, and J. B. Stall. Jun 82, 68p
EPA-600/5-82-003
Contract EPA-68-03-2597

This report compares two approaches to the agricultural nonpoint source pollution control problem: source control and instream water quality management (ISWQM). Source control is a strategy of controlling pollution loadings by using standards such as soil loss limits or best management practices without relating them directly to water quality goals. ISWQM is a strategy for determining water quality goals by examining pollution effects and other considerations and developing a resource management plan for achieving those goals. ISWQM relates land management more closely to water quality goals. The report discusses the information needs, institutional arrangements, and the strengths and weaknesses of each approach.

PB83-852483 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Agricultural Machinery. June, 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 137p
Supersedes PB80-857352.

This bibliography contains citations concerning the mechanics, design, and performance of agricultural machinery. Citations covering specific farming equipment and mechanical systems, such as harvesters, tractors, feed mixers, seeders, irrigators, tillers, sorters, and sprayers, are included. (This updated bibliography contains 118 citations, 63 of which are new entries to the previous edition.)

PB83-852491 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Agricultural Machinery. June, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 177p
Supersedes PB80-857360.

This bibliography contains citations concerning the state of the art in agricultural machinery technology. Mathematical modelling and research through simulation are utilized to determine energy and production efficiency and reliability of various farm equipment. Automatic control and guidance systems, machine storage, human factor design engineering, cost factors and maintenance management relative to seed processing, harvesting, and bagging operations are included. (This updated bibliography contains 196 citations, 134 of which are new entries to the previous edition.)

2D. Agronomy and Horticulture

PB83-113175 PC **A03**/MF **A01**
Central Inst. of Medicinal and Aromatic Plants, Lucknow (India).
Sapogenin Bearing Species of Yams and Their Cultivation in India,
Akhtar Hussain, Pratap Singh, and G. N. Srivastava. 1979, 26p FARM BULL-14

The various topics covered in this bulletin are: Botany; soil and climate; propagation; field preparation and planting, interculture, fertilizer application; irrigation; pests and diseases; harvesting, chemistry and uses, and economics of cultivation of sapogenin bearing species of yams.

2E. Animal Husbandry

PB83-111567 PC **E11**/MF **E11**
Commission of the European Communities, Luxembourg.
Communicable Diseases Resulting from Storage, Handling, Transport and Landspreading of Manures. Proceedings of a Workshop Held in Hanover, Germany, on November 4-6, 1980,
J. R. Walton, and E. G. White. c1982, 265p EUR-7627-EN, ISBN-92-825-2678-X
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The risk to animal health caused by the use of agricultural wastes as manure is examined. Problems encountered in the Member States of the EC by the widespread use of slurries are discussed and methods of slurry treatment to ensure reasonable/absolute freedom from prevalent pathogens are described. It is confirmed that the guidelines compiled at the Dublin workshop in 1977 remain generally applicable with certain modifications for notifiable diseases and for particularly resistant pathogens. Slurries produced in winter should be stored for at least 90 days and care must be taken in the use of slurry from animals on copper-supplemented diets. Current guidelines should be made well known to farmers. Further research is needed to determine possible levels of pasture contamination and to evaluate alternative methods for disinfection of slurry.

2F. Forestry

DE82900753 MF **A01**
Sveriges Lantbruksuniversitet, Uppsala.
Structure and Some Dimensional Relations of Six Clones of Salix and Clone of Populus (Trichocarpa X Deltoides) from a Clonal Trial at Studsvik, Sweden.
L. Olsson, and J. G. K. Flower-Ellis. 1981, 48p SLU-ESO-TR-7
Portions of this report are illegible.
U.S. Sales Only. Available in microfiche only.

The morphlogy and dimensional relations of current shoots on two-year-old stools of six Salix and one Populus clone were studied. The aims of the study were (a) to describe the structure of the shoot population, (b) to develop regression relationships for estimating shoot dry weight and surface area from non-destructive measurements. Results reported here refer to a single occasion in autumm 1978, but were intended to give guidance in the preparation of sampling system for actively growing stand. Shoot basal diameter was the estimative variable which gave rise to the smallest absolute and relative standard errors of estimate for the various characters studies studied. Although the form of the relationships was similar for all clones studied, when joint relationships were applied to individual clones, systematic errors of estimation occurred for most characters. Estimates of the variance of the characters studied cannot confidently be used in developing a sampling system for growing stands. The change in variance with time during the growing season needs to be studied seperately. Since most of the relationships found were specific for individual clones, they should be used with caution for estimates in clones not included in the present material or differing in respect e.g. of stool age. (ERA citation 07:042872)

DE82900911 MF **A01**
Sveriges Lantbruksuniversitet, Uppsala. Inst. foer Ekologi och Miljoevaard.
Wood Density and the Weight and Proportion of Bark in Current Shoots of Salix Clones.
J. G. K. Flower-Ellis, and L. Olsson. 1981, 29p SLU-ESO-TR-18, EFP-TR-18
Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

Wood density and the weight per unit length and percentage of bark by weight were studied in current shoots in a total of 21 Salix clones in a clone trial at Studsvik, Sweden. For six of the clones, these characters were studied in both 1978 and 1979. The stools were two, and three years old, respectively, in those years. Wood density was linearly related to diameter on bark within shoots in four of six clones in 1978 and 1979, and in 12 of 15 clones in 1979. Regressions accounted for 20 to 88% of the variation in wood density within shoots. Density was not correlated with internode length, which is regarded as an expression for growth rate. The range in wood density, as a calculated at a standard diameter, was 266 to 397 kg/m exp 3 . The range in density tended to increase with increases in the number of clones studied, and varied between the two years. Bark weight per unit length was curvilinearly related to diameter within the shoot. Regressions accounted for 89 to 99% of the variation in the bark weight per unit length. Limitations in the comparability of results are discussed. (ERA citation 07:042853)

N82-31750/4 PC **A02**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
The Use of Orbital Images as an Adequate Form of Control of Preserved Areas Utilizacao de Imagens Orbitais COMO Forma Adequada No Controle de Areas de Preservacao.
J. R. Dossantos. Mar 82, 16p INPE-2064-RPE/306
Text in Portugese. Submitted for Publication Sponsored in Part by the National Council for Scientific and Technical Development and the Brazilian Inst. For Forestry Development. Presented at the 33RD Ann. Meeting of Sbpc, Salvador, Brazil, 8-15 Jul. 1981.

The synoptic view and the repetitive acquisition of LANDSAT imagery provide precise information, in real time, for monitoring preserved areas based on spectral, temporal and spatial properties. The systematic annual burning, which causes the degradation of ecosystems in the National Park of Araguaia was monitored. LANDSAT imagery of channel 5 (0.6 to 0.7 microns) and 7 (0.8 to 1.1 microns), at the scale of 1:250.000, were used to identify and delimit vegetation units and burned area, based on photointerpretation parameter of tonality. The results show that the gallery forest can be discriminated from the seasonally flooded 'campo cerrado' and that 4,14% of the study areas was burned. It was concluded that LANDSAT images can be used for the implementation of environmental protection in National Parks.

PB83-110643 PC **A03**/MF **A01**
University of the South, Sewanee, TN. Dept. of Biology.
Secondary Succession in the Spruce-Fir Forest of the Great Smoky Mountains National Park.
Research/Resources Management rept.,
George S. Ramseur. 1976, 38p R/RM/SER-7

This study sought to determine the rate of secondary succession in a spruce-fir forest in Great Smoky Mountains National Park. Study plots were established with fixed permanent landmarks as reference points. Individual trees were then located by azimuth and distance from the reference points. The data are presented in the form of computer printouts and computer-plotted tree maps.

PB83-111468 PC **A02**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Green Ash Seed Sources for North Dakota.
Forest Service research paper (Final),
James L. Van Deusen, and Richard A. Cunningham. Sep 82, 10p FSRP-RM-236

Based on survival and height after eight field seasons, seed from the following provenances is recommended

for use in growing planting stock for use in North Dakota: Aten, Nebr., Gettysburg, S. Dak.; Fairth, S. Dak.; Lisco, Nebr.; Beaver Crossing, Nebr.; Belfield, N. Dak.; Prairie City, S. Dak.; Bismarck, N. Dak.; and Redfield, S. Dak.

PB83-112060 PC A02/MF A01
Intermountain Forest and Range Experiment Station, Ogden, UT.
How to Interpret Tree Mortality on Large-Scale Color Aerial Photographs.
General technical rept.,
Frank C. Croft, Robert C. Heller, and David A. Hamilton, Jr. Aug 82, 17p FSGTR/INT-124

This paper describes photo interpretation techniques for use in sampling for mortality rates with large-scale aerial photography in the Inland Empire. Specifications are given for 70 mm color transparencies. Equipment needed for interpretation is described. Procedures to be used in interpreting the 70 mm photography are discussed with particular emphasis given to problems of species identification.

PB83-112078 PC A02/MF A01
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Ponderosa Pine Mortality Resulting from a Mountain Pine Beetle Outbreak.
Forest Service research paper (Final),
William F. McCambridge, Frank G. Hawksworth, Carleton B. Edminster, and John G. Laut. Sep 82, 11p FSRP-RM-235

From 1965 to 1978 mountain pine beetles killed 25% of the pines taller than 4.5 feet in a study area in north-central Colorado. Mortality was directly related to number of trees per acre and presence of dwarf mistletoe, but not to site index, elevation, or percent of Douglas-fir in the stand.

PB83-112086 PC A06/MF A01
Intermountain Forest and Range Experiment Station, Ogden, UT.
User's Guide to the Stand Prognosis Model.
General technical rept.,
William R. Wykoff, Nicholas L. Crookston, and Albert R. Stage. Sep 82, 117p FSGTR/INT-133

The Stand Prognosis Model is a computer program that projects the development of forest stands in the Northern Rocky Mountains. Thinning options allow for simulation of a variety of management strategies. Input consists of a stand inventory, including sample tree records, and a set of option selection instructions. Outpit includes data normally found in stand, stock, and yield tables and details on selected sample trees. Preparation of input, interpretation of output, and model formulation are described.

PB83-112094 PC A06/MF A01
Northeastern Forest Experiment Station, Broomall, PA.
Forest Statistics for New York, 1980.
Forest Service resource bulletin (Final),
Thomas J. Considine, Jr., and Thomas S. Frieswyk. 1982, 122p FSRB-NE-71, NEFES/83-2

The study is a statistical report on the third forest survey of New York conducted in 1978 and 1979. Statistical findings are based on data from remeasured and new 10-point variable-radius plots. The current status of forest-land area, timber volume, and annual growth and removals is presented. Timber products output by timber industries, based on a 1979 updated canvass of manufacturers is presented.

PB83-112110 PC A04/MF A01
Intermountain Forest and Range Experiment Station, Ogden, UT.
A User's Guide to the Combined Stand Prognosis and Douglas-Fir Tussock Moth Outbreak Model.
General technical rept.,
Robert A. Monserud, and Nicholas L. Crookston. Sep 82, 54p FSGTR/INT-127

Documentation is given for using a simulation model combining the Stand Prognosis Model and the Douglas-fir Tussock Moth Outbreak Model. Four major areas are addressed in the report.

PB83-112144 PC A03/MF A01
Intermountain Forest and Range Experiment Station, Ogden, UT.
Seventy Years of Vegetative Change in a Managed Ponderosa Pine Forest in Western Montana: Implications for Resource Management.
General technical rept.,
George E. Gruell, Wyman C. Schmidt, Stephen F. Arno, and William J. Reich. Aug 82, 46p FSGTR/INT-130

The report interprets changes in forest vegetation resulting from timber harvests and a marked reduction in the occurrence of fire. A series of photographs at about 10-year intervals, starting in 1909, provide the basis for describing how a ponderosa pine forest has changed since settlement. The reason for changes and implications on wildlife, timber, esthetics, and livestock grazing are discussed.

PB83-112169 PC A02/MF A01
Intermountain Forest and Range Experiment Station, Ogden, UT.
Ecological Adaptations in Douglas-Fir Populations. II. Western Montana.
Forest Service research paper,
Gerald E. Rehfeldt. Jul 82, 12p FSRP/INT-295

Populations of Douglas-fir (Pseudotsuga menziesii) from Montana west of the Continental Divide were compared in common environments. Differentiation was observed for six variables reflecting growth potential, phenology and cold hardiness. Adaptation of populations for numerous traits is viewed as a balance between selection of high growth potential in relatively mild environments and selection for cold hardiness in severe environments.

PB83-112920 PC A08/MF A01
Great Smoky Mountains National Park, Gatlinburg, TN. Uplands Field Research Lab.
The Vegetation of the Grassy Balds and Other High Elevation Disturbed Areas in the Great Smoky Mountains National Park.
Research/Resources Management rept.,
Mary Lindsay. Jun 78, 161p NPS/R/RM-26

Grassy balds and other high elevation communities of the Great Smoky Mountains were studied. Woody plant invasion of Gregory and Andrews Balds was found to be progressing at a rate which would cover the balds with trees in about 100 years. Ordination of the sites suggested that grassy balds are an exception to the general vegetation of the Great Smoky Mountains that were created and maintained by continued disturbance (grazing). Disturbance such as mowing, trampling, or grazing, continuing in the present, produces stands with a high percentage of exotic species that are very similiar to each other, regardless of their elevation. Tree distribution is influenced mainly by moisture and elevational gradients.

PB83-113647 PC A02/MF A01
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Leaf Area Determinations for Subalpine Tree Species in the Central Rocky Mountains.
Forest Service research paper (Final),
Merrill R. Kaufmann, Carleton B. Edminster, and Charles A. Troendle. Sep 82, 11p FSRP-RM-238

Needle area of Engelmann spruce, subalpine fir, and lodgepole pine and leaf area of aspen are predicted from d.b.h. or tree height. Leaf area index can be calculated from stand basal area.

PB83-113910 PC E03/MF E03
Commission of the European Communities, Luxembourg.
Feasibility Study of Short Rotation Forestry for Combined Pulp and Energy Purposes and Sparsely Populated Areas.
Final rept.,
J. A. Van Veen, M. J. H. Jansen, H. Breteler, J. J. Olie, and M. J. Frissel. c1981, 24p EUR-7561-EN
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The mean annual dry matter production of a short-rotation poplar forest was 14.4 ton/ha during a 5 years growing period. A nitrogen balance was made to estimate the need for nitrogen of the system. During the growing period trees took up 542 kg N/ha of which 64% is in bole and branches. In the 5th year denitrification was measured in undisturbed columns in the field using the acetylene-inhibition technique. An annual denitrification rate of 18 kg N/ha was estimated on the basis of the observed N2O-profile. The system needed an annual input of 122 kg N/ha to balance the nitrogen budget. The energy balance showed that at the present dry matter production the system had a net output of 54 GJ/ha/y. Although this study shows that, at the present level of dry matter production, short-rotation forestry is an energy producing system, both the dry matter production and the energy prices have to increase considerably to make the system economically feasible. (Copyright (c) ECSC-EEC-EAEC, Brussels-Luxembourg, 1981.)

3.

ASTRONOMY AND ASTROPHYSICS

3B. Astrophysics

AD-A119 441/4 PC A02/MF A01
Air Force Geophysics Lab., Hanscom AFB, MA.
Injection Onsets of Approximately 2 GeV Protons, Approximately 1 MeV Electrons, and Approximately 100 keV Electrons in Solar Cosmic Ray Flares.
E. W. Cliver, S. W. Kahler, M. A. Shea, and D. F. Smart. 26 Oct 81, 11p Rept no. AFGL-TR-82-0263
Pub. in The Astrophysical Jnl., v260 n1 p362-370, 1 Sep 82.

No abstract available.

AD-A119 524/7 PC A02/MF A01
High Altitude Observatory, Boulder, CO.
Solar Luminosity Variation. III. Calcium K Variation from Solar Minimum to Maximum in Cycle 21,
O. R. White, and W. C. Livingston. 16 Mar 81, 21p AFGL-TR-82-0255
Pub. in Astrophysical Jnl., v249 p798-816, 15 Oct 81.

No abstract available.

AD-A119 565/0 PC A02/MF A01
Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
Detection of Nonthermal Continuum Radiation in Saturn's Magnetosphere.
Progress rept. for period ending 1982,
W. S. Kurth, F. L. Scarf, J. D. Sullivan, and D. A. Gurnett. 15 Mar 82, 6p
Contract N00014-76-C-0016, Grant NGL-16-001-043
Pub. in Geophysical Research Letters, v9 n8 p889-892 Aug 82.

No abstract available.

N82-31865/0 PC A02/MF A01
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Numerical Simulation of the Magnetospheric Gate Model for X-Ray Bursters.
S. G. Starrfield, S. Kenyon, J. W. Truran, and W. M. Sparks. 1981, 5p NAS 1.15:84712, DE82-000581, NASA-TM-84712
Contract W-7405-ENG-36
Presented at the Conf. On gamma-Ray Bursters, la Jolla, Calif., 5 Aug. 1981.

A Lagrangian, fully implicit, one dimensional hydrodynamic computer code was used to investigate the evolution of a gas cloud impacting the surface of a 20 km, 1 Msub solar neutron star. This gas is initially at rest with respect to the surface of the neutron star, extends to 185 km above the surface, and is optically thick. The infall results in a burst which lasts about 0.1 seconds and reached a peak luminosity and effective temperature of 240,000 Lsub solar and 9 million; respectively. The burst was followed by a phase of oscillations with a period 0.2 seconds.

N82-32207/4 PC **A02/MF A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
SIRTF - the Shuttle Infrared Telescope Facility.
M. W. Werner, and F. C. Witteborn. Aug 82, 16p
NAS 1.15:81322, A-9049, NASA-TM-81322

The Shuttle Infrared Telescope (SIRTF) is a 1-m class cryogenically cooled telescope to be operated from the shuttle as a facility for infrared astronomy. By exploiting the very low infrared background of space, SIRTF will achieve 100 to 1000 times the sensitivity currently attainable at infrared wavelengths between 2 and 200 microns. The scientific requirements of SIRTF, the current design concept, and the scientific capabilities of the systems are reviewed. We also review recent experimental results showing that mirrors made of glassy materials may be suitable for use in large cryogenic telescopes such as SIRTF.

N82-32208/2 PC **A06/MF A01**
Alabama Univ., Birmingham.
Extended Range X-Ray Telescope: X-Ray Microscope Design.
Final Report, 29 Jan. - 28 Jun. 1982.
D. L. Shealy, A. Kassim, and S. Chao. 30 Jul 82, 118p NAS 1.26:162072, NASA-CR-162072
Contract NAS8-34728

A glancing incidence X-ray microscope using a confocal hyperboloid ellipsoid mirror was designed to couple optically a Wolter 1 telescope to a CCD focal plane detector. Both the RMS spot size and the point spread function calculations were used to evaluate the resolution, defocusing, and vignetting effects of the system for microscope focal lengths of 1, 1.5, and 2 meters and for magnifications varying from 2 to 10x. For the specific application with the S-056 telescope, a 2 meter, 8x microscope with a fabrication ratio of the microscope mirror length to the inner diameter at hyperboloid ellipsoid intersection of 2.5 was designed to be used with a thinned, back illuminated CCD detector array with 320 by 512, 30 micron pixels.

N82-32209/0 PC **A12/MF A01**
Oslo Univ. (Norway). Inst. of Theoretical Astrophysics.
LEST: Large European Solar Telescope.
O. Engvold, and M. Hefter. 30 Apr 82, 261p
Sponsored by Royal Swedish Academy of Sciences, Norwegian Research Council for Science and the Humanities and Swedish Research Council for Natural Science. Prepared for the Joint Organization for Solar Observations.

No abstract available.

N82-32226/4 PC **A02/MF A01**
Tokyo Univ. (Japan). Inst. for Nuclear Study.
Cosmological Origin of Mass Scales.
H. Terazawa. Feb 81, 17p DE82-700129, INS-400

The possibility that spontaneous breakdown of conformal invariance due to the very existence of our universe originates all the mass (or length) scales ranging from the Planck mass (approx. 10 to the 19th power GeV) to the Hubble constant (approx. 10 to the -42nd power GeV). It is suggested that the photon may have a curvature-dependent mass which is as small as 10 to the -42nd power GeV. Also, a possible clue to the Dirac's large number hypothesis is presented.

N82-32227/2 PC **A07/MF A01**
Lund Observatory (Sweden).
Scattering by Ensembles of Small Particles Experiment, Theory and Application.
B. A. S. Gustafson. 1980, 130p NAS 1.26:169219, DE81-700760, NASA-CR-169219
Grant NSG-7093
Sponsored in Part by Uppsala Univ., the Royal Swedish Academy of Sciences, and Lund Univ.

A hypothetical self consistent picture of evolution of prestellar interstellar dust through a comet phase leads to predictions about the composition of the circum-solar dust cloud. Scattering properties of thus resulting conglomerates with a bird's-nest type of structure are investigated using a micro-wave analogue technique. Approximate theoretical methods of general interest are developed which compared favorably with the experimental results. The principal features of scattering of visible radiation by zodiacal light particles are reasonably reproduced. A component which is suggestive of (ALPHA)-meteoroids is also predicted.

N82-32228/0 PC **A04/MF A01**
Paris-11 Univ., Orsay (France).
A Mean Field Calculation of the Equation of State of Supernova Matter.
P. Bonche. Dec 80, 67p DE81-700829, IPNO-TH-80-66

The equation of state for hot dense matter occurring in stellar collapse is calculated using the Hartree-Fock approximation at finite temperature. The effective nucleon-nucleon interaction is a modified Skyrme force which gives a rather good value of the compression modulus in nuclear matter. Results are presented for the adiabat S=1 per baryon, with a fixed value of the electron fraction Y sub e = 0.25, in the density range rho = 0.02 to 0.07 baryons per fm(3). It is found that nuclei are still present in the medium. As a consequence the adiabatic index is slightly less than 4/3. The presence of a transition, around half nuclear matter density, towards a phase made of bubbles is also discussed.

N82-32229/8 PC **A02/MF A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Thermonuclear Runaways in Thick Hydrogen Rich Envelopes of Neutron Stars.
S. G. Starrfield, S. Kenyon, J. W. Truran, and W. M. Sparks. 1981, 8p NAS 1.15:84713, DE82-000582, NASA-TM-84713
Contract W-7405-ENG-36
Prepared in Cooperation with Lasl, N. Mex. Submitted for Publication. Presented at the Workshop on gamma Ray Transients and Related Astrophys. Phenomena, la Jolla, Calif., 5 Aug. 1981.

A Lagrangian, fully implicit, one dimensional hydrodynamic computer code was used to evolve thermonuclear runaways in the accreted hydrogen rich envelopes of 1.0 Msub solar neutron stars with radii of 10 km and 20 km. Simulations produce outbursts which last from about 750 seconds to about one week. Peak effective temeratures and luninosities were 26 million K and 80 thousand Lsub solar for the 10 km study and 5.3 millison and 600 Lsub solar for the 20 km study. Hydrodynamic expansion on the 10 km neutron star produced a precursor lasting about one ten thousandth seconds.

N82-32243/9 PC **A03/MF A01**
Stanford Univ., CA. Inst. for Plasma Research.
Correlation of Hard X-Ray and Type 3 Bursts in Solar Flares.
V. Petrosian, and J. Leach. 1982, 27p NAS 1.26:169167, NASA-CR-169167
Grant NSG-7092

Correlations between X-ray and type 3 radio emission of solar bursts are described through a bivariate distribution function. Procedures for determining the form of this distribution are described. A model is constructed to explain the correlation between the X-ray spectral index and the ratio of X-ray to radio intensities. Implications of the model are discussed.

N82-32244/7 PC **A03/MF A01**
Nielsen Engineering and Research, Inc., Mountain View, CA.
Calculation of Solar Wind Flows About Terrestrial Planets.
Contractor Report, Jul. 1978 - Dec. 1981.
S. S. Stahara, and J. R. Spreiter. Aug 82, 43p NAS 1.26:169274, NEAR-TR-262, NASA-CR-169274
Contract NASW-3184

A computational model was developed for the determination of the plasma and magnetic field properties of the global interaction of the solar wind with terrestrial planetary magneto/ionospheres. The theoretical method is based on an established single fluid, steady, dissipationless, magnetohydrodynamic continuum model, and is appropriate for the calculation of supersonic, super Alfvenic solar wind flow past terrestrial planets. A summary is provided of the important research results.

N82-32245/4 PC **A06/MF A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Interaction of the Solar Wind with Cometary Ionospheres Interacao Do Vento Solar COM a Inosfera de Cometas.
M.S. Thesis.
S. Desouza. Jan 82, 105p INPE-2311-TDL/075
Text in Portugese.

The interaction of the solar wind with the comet's ionosphere is studied. Exact solutions for the number density of the neutral particles outgassing from the comets nucleus, in the presence of the solar radiation pressure, are obtained. This kind of information is extremely important in the formation of the shock wave and tangential discontinuity, on the sunside of the comet, after the neutrals become ionized. Solutions of the conservation equation of the number density, mass, momentum and energy, are also obtained.

N82-32246/2 PC **A03/MF A01**
Bern Univ. (Switzerland). Div. of Solar Observations.
Solar Data, January - June 1982.
Annual Report, Jan. - Jun. 1982.
M. Fuhrer, N. Kaempfer, A. Magun, W. Schoechlin, and M. Staehli. Jul 82, 35p REPT-48

Standard measurements of solar activity carried out at the solar observatory are presented. The measurements show start, maximum, duration, peak flux, and circular polarization at peak as percentage, of outstanding events.

PB83-111393 PC **A06/MF A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 454, June 1982. Part I (Prompt Reports). Data for May 1982, April 1982,
Helen E. Coffey. Jun 82, 154p SGD-454-PT-1, NOAA-820806041
See also PB82-262684, and Part 2, PB83-111401.

This prompt report provides data for June 1982 on: alert periods, daily solar indices, solar flares, solar radio emission, solar wind measurements, inferred interplanetary magnetic field polarities, mean solar magnetic field, spacecraft observations, and Boulder Geomagnetic Substorm Log. It also provides data for May 1982 on: daily solar activity centers, sudden ionospheric disturbances, spacecraft observations, solar radio emission, cosmic rays, geomagnetic indices and radio propagation indices. Late data includes solar radio emission March 1982, and cosmic rays January-March 1982.

PB83-111401 PC **A04/MF A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 454, June 1982. Part II (Comprehensive Reports). Data for December 1981,
Helen Coffey. Jun 82, 52p SGD-454-PT-2, NOAA-82080605
See also Part 1, PB83-111393.

In addition to an index for 1981-1982, this issue of comprehensive reports provides data for December 1981 on solar radio emission, solar x-ray radiation, and mass ejections from the sun. Miscellaneous data includes active regions 12 October - 11 November 1981, synoptic solar maps 12 October - 11 November 1981, and IMP Electrons, Protons, Alphas October 1980.

4.

ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A119 442/2 PC **A02/MF A01**
Air Force Geophysics Lab., Hanscom AFB, MA.

Field 4—ATMOSPHERIC SCIENCES

Group 4A—Atmospheric Physics

A Large-Amplitude Traveling Ionospheric Disturbance Produced by the May 18, 1980, Explosion of Mount Saint Helens,
David H. Roberts, John A. Klobuchar, Paul F. Fougere, and David H. Hendrickson. 22 Dec 81, 13p Rept no. AFGL-TR-82-0262
Pub. in Jnl. of Geophysical Research, v87 nA8 p6291-6301, 1 Aug 82.

No abstract available.

AD-A119 446/3 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
The Reactions of Ba+ Ions with O2 and H2O,
Edmond Murad. 22 Mar 82, 5p Rept no. AFGL-TR-82-0261
Pub. in Jnl. of Chemical Physics, v77 n4 p2057-2060, 15 Aug 82.

No abstract available.

AD-A119 485/1 PC **A04**/MF **A01**
Aerospace Corp., El Segundo, CA. Space Sciences Lab.
Observation and Modeling of Energetic Particles at Synchronous Orbit on July 29, 1977.
Technical rept.,
Alfred L. Vampola, D. N. Baker, P. R. Higbie, T. A. Fritz, and B. Wilken. 16 Aug 82, 57p TR-0082(2940-05)-7, SD-TR-82-56
Contract F04701-81-C-0082
Prepared in cooperation with Los Alamos National Lab., NM, Grant NSF-ATM79-23586 ,Space /Environment Lab., NOAA, Boulder, CO, Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (Germany, F.R.), Lockheed Palo Alto Research Lab., CA, California Univ., Los Angeles, New Hampshire Univ., Durham, TRW Systems, Redondo Beach, CA and Goddard Space Flight Center, Greenbelt, MD.

In the twelve hours following a worldwide storm sudden commencement at 0027 UT on 29 July, there was a series of at least four magnetospheric substorms, the last and largest of which exhibited an expansion phase onset at approximately 1200 UT. Data from six spacecraft in three general local time groupings (0300, 0700, and 1300 LT) were examined and vector magnetic field data and energetic electron and ion data from approximately 15 keV to greater than 2 MeV were employed. Four primary types of studies were carried out: (1) Timing and morphology of energetic particle injections; (2) Variation of particle phase space densities, f (microns = p2/2mB) using local magnetic field and particle flux data; (3) Measurement of boundary motions using high-energy ion gradient anisotropies; and (4) Adiabatic modeling which included injection, large-scale convection, corotation, and gradient drifts. For the 1200 UT substorm, it is concluded that there was a substantial flux dropout in a broad sector near local midnight due to a large-scale boundary motion followed by a recovery to a predropout configuration. There were then several subsequent injection events with distinct onsets (extending as far eastward as 0300 LT) for which ion anisotropy information suggests an inward motion of particles from outside of geostationary orbit. Particle drift information reveals that these particles drifted azimuthally completely around the earth. It is also concluded from the phase space density studies that 'fresh' particles with magnetic moments up to at least several hundred MeV/gauss were injected near geostationary orbit.

AD-A119 496/8 PC **A06**/MF **A01**
Naval Surface Weapons Center, Dahlgren, VA.
A Method to Correlate the Upper Air Density with Surface Density and Estimate the Ballistic Density for Air or Surface Launched Missiles.
Final rept.,
Loren J. McAnelly. Jul 82, 118p Rept no. NSWC/TR-82-81

Atmospheric data collected twice daily from five ocean stations over a period of 7 years were used in a study to correlate ballistic densities at various levels. The study indicates that a good correlation does exist and that tables, nomograms, or data in a suitable format should be produced for use with new and existing fire control computers and range tables prepared for the Fleet. Two exponential functions of altitude were used to express the density-one from surface to 36,000 ft, the other from 36,000 to 65,000 ft. The coefficients were selected in a manner that produces a continuous function from sea level to 65,000 ft. The coefficients of the two functions were determined using a nonlinear least-squares technique. Fluctuations in the density profiles below 5,000 ft altitude were noted and were investigated by fitting a sample of temperature and pressure data with a least-square technique. Ballistic densities for firing at surface targets were computed for altitudes to 50,000 ft. While the current projectiles in the Fleet may not reach an altitude of 50,000 ft., this may become a reality in the near future. The procedure presented in this report could very easily be modified to compute ballistic density when firing at air targets at altitudes up to 50,000 ft. (Author)

AD-A119 509/8 PC **A02**/MF **A01**
Massachusetts Univ., Amherst. Astronomy Research Facility.
Infrared Emission Spectroscopy of Glow Discharge Formed in Low Pressure Atmospheric Gases,
H. Sakai, P. Hansen, M. Esplin, R. Johansson, and M. Peltola. 19 Aug 81, 9p AFGL-TR-82-0269
Contracts F19628-81-K-0007, F19628-76-C-0087
Pub. in Applied Optics, v21 n2 p228-235, 15 Jan 82.

No abstract available.

AD-A119 575/9 PC **A03**/MF **A01**
Naval Underwater Systems Center, New London, CT. New London Lab.
Prediction of Optical Image Quality Near the Sea Surface from Meteorological Measurements.
Technical rept.,
Frank S. Replogle, Jr. 13 Jul 82, 46p Rept no. NUSC-TR-6713

This report presents a mechanism to calculate the optical index structure constant, C2N from bulk meteorological measurements (air and water temperatures, wind speed, air humidity) made over the ocean. From this, and a formulation of the near-field optical propagation from an incoherent point source, the expected line spread function for near-the-sea-surface lines-of-sight are calculated. Finally, three series of photographic line-width observations (made during unstable, neutral, and stable atmospheric buoyancy conditions) are compared with calculated line widths. Mean values of observed results agree with the calculations within about 25 percent for conditions of strong atmospheric instability. Since comparisons were made over a variety of target ranges, wind speeds, and camera elevations, it is concluded that the formulations derived are accurate to at least + or - 25 percent for conditions of strong atmospheric instability. Observations made under conditions of neutral and stable atmospheric buoyancy were instrumentally limited to an angular sub-tense of 2 to 4 arc-sec. These measured line-width values fall between 1.9 and 0.6 times the values computed from meteorological measurements. The variability of image spreading observed across the target fields is indicative of the difficulty of employing a single mechanism to correct for atmospherically induced image-smear. (Author)

AD-A119 758/1 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
The Mass and Angular Momentum Balance of the Zonally-Averaged Global Circulation.
Master's thesis,
Ronald D. Townsend, and Donald R. Johnson. 1981, 52p Rept no. AFIT/Ci/NR-81-34T

In this paper diagnostics of the zonally-averaged global circulation in both isobaric and isentropic coordinates are presented. Although diagnostics for the entire FGGE year have been computed, only the results for January, April, July and October will be shown. The discussion focuses primarily on January or the Northern Hemisphere winter circulation. After a brief discussion of the data processing procedures the isobaric and isentroptic mass circulations are compared. The meridional distribution of zonally-averaged diabatic heating is calculated indirectly from the isentropic meridional mass circulation. In the final portion of the results diagnostics of relative angular momentum transport in isobaric and isentropic coordinates are contrasted and the forcing of mean meridional circulations is briefly discussed. (Author)

AD-A119 777/1 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Results on Aerosol Light Absorption,
Frederic E. Volz. 1982, 18p Rept no. AFGL-TR-82-0271
Pub. in Light Absorption by Aerosol Particles, p357-372 1982.

No abstract available.

DE82015490 PC **A06**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Correlations of Insolation and Wind Data for SOLMET Stations.
D. E. Randall, and N. R. Grandjean. Apr 82, 112p SAND-82-0094
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

Correlations of direct insolation and wind speed data based upon a 12-1/2-yr period are presented for 26 SOLMET stations distributed over the contiguous United States. These correlations indicate that for three different solar collector tracking apertures, 97-1/2% of the available direct insolation occurs at wind speeds of 15 m/s (33.6 mph) or less for all 26 stations. Selected frequency distributions for these insolation, wind speed, and wind direction data spanning the 1952 to 1964 time frame are also presented.

N82-31849/4 PC **A05**/MF **A01**
Hampton Inst., VA.
Local Effects of Partly-Cloudy Skies on Solar and Emitted Radiation.
Annual Report, 1 Aug. 1981 - 31 Jul. 1982.
D. A. Whitney, and D. D. Venable. 31 Jul 82, 100p NAS 1.26:169272, NASA-CR-169272
Contract NAG1-87

A computer automated data acquisition system for atmospheric emittance, and global solar, downwelled diffuse solar, and direct solar irradiances is discussed. Hourly-integrated global solar and atmospheric emitted radiances were measured continuously from February 1981 and hourly-integrated diffuse solar and direct solar irradiances were measured continuously from October 1981. One-minute integrated data are available for each of these components from February 1982. The results of the correlation of global insolation with fractional cloud cover for the first year's data set. A February data set, composed of one-minute integrated global insolation and direct solar irradiance, cloud cover fractions, meteorological data from nearby weather stations, and GOES East satellite radiometric data, was collected to test the theoretical model of satellite radiometric data correlation and develop the cloud dependence for the local measurement site.

N82-31851/0 PC **A02**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Longitudinal Differences in the Characteristics of Spread F Occurrence Rates Along the Longitude of the American Continent and its Implications for the Dynamic Mechanism of the F Region Diferencas Longitudinais NAS Caracteristicas DA Camada F Dispersa, NA Longitude Do Continente Americano, E Suas Implicacoes No Mecanismo Dinamo DA Regiao F.
M. A. Abdu, J. A. Bittencourt, and I. S. Batista. Mar 82, 16p INPE-1941-RPE/260
In Portuguese; English Summary. Sponsored in Part by National Fund for Scientific and Technical Development.

A comparative study is carried out of the spread F occurrence rates at two stations located along the magnetic equator in the American zone. While there are similarities in the gross features of the range type spread F occurrences, profound differences, on a seasonal basis, are present in the case of the frequency type spread F at the two stations. Profound dissimilarities are observed also in evening enhancement in the F region vertical drift velocity (Vz). An attempt is made to interpret these results in terms of the differences in the magnetic field declinations at the two stations that cause significant differences in the conjugate E region sunset durations and, hence, in differing rates of F region polarization electric field developments at these stations. Influence of the F region dynamo on the gross features of the prereversal V sub peak and spread F characteristics seems to be born out in the present results.

N82-31852/8 PC **A03**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

A Numerical Study of the Structure of the Richardson Grid when Applied to the Equations of Long Gravity Waves Um Estudo Numerico DA Estrutura DA Grade de Richardson, Quando Aplicada as Equacoes das Ondas Longas de Gravidade.
M. A. M. Lemes, and Y. Yamazaki. Feb 82, 28p
INPE-2329-RPE/404
In Portuguese; English Summary.

Barotropic oscillations in an incompressible fluid confined in a one-dimensional channel are numerically simulated. The discrepancies between the analytical and numerical solutions for the linear case without bottom topography are discussed. The numerical method is applied (centered differences in space and time, in a Richardson grid) to the nonlinear problem of wave breaking, with and without topography.

N82-31855/1 PC **A02**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
The Use of VLF Phase Measurements to Associate Increased Particle Precipitation in the Region of the Brazilian Magnetic Anomaly with Magnetic Storms Aumento DA Precipitacao de Particulas NA Regiao DA Anomalia Magnetica Brasileira, Associado a Tempestades Magneticas Atraves de Medidas de Fase Em VLF.
M. A. Abdu, I. S. Batista, L. R. Piazza, and O. Massambani. Mar 82, 14p INPE-2346-PRE/088
Text in Portugese. Sponsored in Part by the National Fund for Scientific and Technical Development.

Phase recordings at Atibaia, Brazil, (23 deg S, 46 deg W) of 13.6 KHz VLF signal transmitted from Golfo Nuevo, Argentina (43 deg S, 65 deg W), a trajectory confined almost completely within the South Atlantic anomaly region, show significant perturbations, indicative of the lowering of the VLF reflection level, following the onset of magnetic disturbances. Simultaneous measurements of the E layer parameters, over Cachoeira Paulista (22 deg S, 45 deg W) also show enhancements, with some delay with respect to the magnetic disturbance onset. These results show magnetic storm associated ionization enhancements taking place in a height region from approximately 110 km down to 70 km, which is interpreted as having been produced by precipitation of high energy charged particles in the South Atlantic magnetic anomaly. The results also suggest some degree of day to day variability in the abundance of metallic species, and/or in the dynamics of the E region over this region.

N82-32248/8 PC **A02**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Terrestrial Electromagnetic Induction by Way of the Sq (Diurnal Solar Variation) in the Region of the Equatorial Electrojet Inducao Eletromagnetica Terrestre Atraves de Sq NA Regiao Do Eletrojato Equatorial.
N. B. Trivedi, and E. G. Desouza. Mar 82, 13p INPE-2354-RPE/408
Text in Portugese.

Magnetotelluric measurements conducted continuously at Eusebio (3.870 S, 321.58 deg E) during the period 1979 to 1980 are used for electromagnetic induction studies. It is shown that the Sq diurnal variation in the region of equatorial electrojet does not have the internal component of induction. The analysis of Eusebio data demonstrated that the diurnal variation in the equatorial electrojet region consists of both internal and external components. These results are presented and discussed.

PB83-110122 PC **A06**/MF **A01**
GCA Corp., Bedford, MA. GCA Technology Div.
National Assessment of the Urban Particulate Problem. Volume IV: Birmingham, Alabama.
Final rept.,
David A. Lynn, and Frank Record. Jun 76, 111p
GCA-TR-76-25-G(4), EPA-450/3-76-026B
Contract EPA-68-02-1376
See also Volume 1, PB-263 665.

This document is one volume of a sixteen-volume report presenting an overall assessment of the particulate problem, which was conducted by GCA/Technology Division for EPA. This particular document is one of fourteen single-area volumes that provide working summaries of data gathered in the fourteen urban areas studied. These city reports primarily provide documentation and background information for Volume I of the study - National Assessment of the Particulate Problem - Final Report. Volume I should be considered the primary output of the report.

PB83-112177 PC **A13**/MF **A01**
GCA Corp., Bedford, MA. GCA Technology Div.
Cost Analysis of Proposed Changes to the Air Quality Modeling Guidelines,
Michael Wojcik, Jane Wojcik, Paul Bareford, Mary Havelock, and Michael Geraghty. Feb 82, 299p
GCA-TR-81-109-G, EPA-450/4-82-014
Contract EPA-68-02-3168
See also PB-288783.Errata sheet inserted.

The Environmental Protection Agency (EPA) has developed a set of guidelines to be followed in any air quality modeling study performed for the EPA. The Guideline on Air Quality Models (AQMG) was issued in 1978 as a part of the Office of Air Quality Planning and Standards Guideline Series. Since the release of the 1978 AQMG, the EPA has had a chance to review its effectiveness and gather together recommendations on how the document could be improved. In 1980, a proposed revision to the 1978 AQMG was issued for review. In this report, GCA examines the costs associated with implementing certain features of the 1980 proposed revision.

4B. Meteorology

AD-A119 443/0 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
A Model for Estimating Persistence Probabilities,
Iver A. Lund, and Paul Tsipouras. 7 Jan 81, 10p Rept no. AFGL-TR-82-0260
Pub. in Jnl. of Applied Meteorology, v21 n7 p988-994 Jul 82.

No abstract available.

AD-A119 576/7 PC **A03**/MF **A01**
Weather Squadron (26th), Blytheville AFB, AR. Detachment 14.
Terminal Forecast Reference Notebook. Detachment 14, 26th Weather Squadron, Blytheville Air Force Base, Arkansas.
Apr 82, 38p

Contents: Topography; Climatology; Weather Regimes; and Local Forecast Aids.

AD-A119 599/9 PC **A08**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Comparison of Two Initialization Methods in Data Assimilation.
Doctoral thesis,
Edward H. Barker. Jun 82, 161p

Two different initialization methods were developed and tested in global data assimilation experiments covering a five-day period. One method was based on the nonlinear normal mode initialization, and the other was based on the balance equation. Both techniques were developed using the calculus of variations methodology. In both methods, the initial divergence was computed from the forecast first-guess fields, except it was partially modified in the nonlinear normal mode method to improve the balance. The assimilation system used to test the initialization methods was developed for the global forecast model at the Fleet Numerical Oceanography Center. This model was adapted from the general circulation model developed at the University of California at Los Angeles. A comparison of the gravity wave noise from the two methods is given for versions of the model with and without heating. Other comparisons are given for divergence, precipitation rates, wave structure and cyclogenesis. The two methods are similar in their performance in data assimilation. The balance equation method is more flexible in weight specification and, consequently the forecasts verify with observations closer than the normal mode method. (Author)

AD-A119 654/2 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
A Composite Study of Comma Clouds and Their Association with Severe Weather Over the Great Plains.
Master's thesis,
James Peter Millard. 1982, 119p Rept no. AFIT/CI/NR/82-57T

Thirty-five comma cloud systems which existed over the Great Plains during the 1980 and 1981 spring seasons (March through June) are analyzed using visible and infrared satellite imagery, rawinsonde data and gridded data sets. Each comma pattern is divided into eleven zones and the soundings from similar zones are then averaged together. Composite kinematic and thermodynamic quantities are examined on isobaric and relative-flow isentropic surfaces. Severe weather is also stratified by zone. Eighty percent of the severe events are found to have occurred in the comma tail (zones C, D and E). A case study of one particular comma cloud system (March 21-22, 1981) is examined separately. This case was characterized by rapid convective cloud growth which developed in situ within the dry intrusion. Development occurred along a dryline where surface convergence was strong and where cold air advection aloft increased the potential instability. Synoptic-scale vertical motions are calculated and found to be upward in the northern portion of the dry intrusion. Comparisons are made to the composite comma cloud. (Author)

AD-A119 730/0 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Moving Boundary Isothermal Fog Chamber (MOBIFOC).
Master's thesis,
George Frederick Fisher. May 82, 120p Rept no. AFIT/CI/NR/82-52T

A new instrument for the study of fog and haze is introduced. The moving Boundary Isothermal Fog Chamber is the first successful attempt to improve upon the operating ranges and reliability of these instruments since they were first introduced 10 years ago. This new concept utilizes moving sidewalls in a rectangular chamber of 2 x 20 x 58 cm and is capable of providing growth times far exceeding those in current instruments. The larger walls of the chamber (20 x 58 cm) are constructed of vulcanized rubber belts covered with a moisture absorbent material (Pellon) which are continually driven by a variable speed motor. The direction of flow is upward against gravity. The result of the marriage of moving sidewalls and upward flow is a nearly plug type flow capable of sustaining large haze droplets for an almost indefinite period of time. The advantages of this unique and innovative instrument are numerous, the least of which is the improvement in growth times over current instruments. The ability to suspend droplets and to directly observe them allow for the study of interaction of various aerosols, chemical processes and studies of visibilities in haze. The chamber has also been designed for later application of thermal gradients and, therefore, for use as a thermal gradient diffusion cloud chamber (TGDCC) which will also have extended growth times over current TGDCC's.

AD-A119 755/7 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Diagnostics of the Heat Sources and Sinks of the Asiatic Monsoon and the Thermally-Forced Planetary Scale Response.
Master's thesis,
Donald R. Johnson, and Ronald D. Townsend. 1981, 72p Rept no. AFIT/CI/NR-81-35T

The purpose of this paper is to provide a descriptive analysis of the planetary scale isentropic mass circulation and energy transport forced by the global distribution of differential heating and to establish a link between mass circulation, energy transport and boundary processes in the satisfaction of global energy balance. Some insight into the global distribution of heating will be provided from the patterns of mass and energy transport, although at the time of preparation of this paper, explicit computations of the diabatic heating have not been completed. In the earlier work of Zillman (1972) and Otto (1974), planetary scale mass circulations associated with the irrotational mode of mass transport were determined from the climatological distribution of diabatic heating. While the fields of the irrotational mode in their work and ours are similar, a detailed comparative discussion of quantitative results has not been included due to the time constraint

for completion of this paper for the Bergen Conference. (Author).

DE82008869 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Coastal Zone Wind Energy. Part I. Potential Wind Power Density Fields Based on 3-D Model Simulations of the Dominant Wind Regimes for Three East and Gulf Coast Areas.
M. Garstang, R. A. Pielke, and J. W. Snow. Apr 80, 35p PNL-3905
Contract AC06-76RL01830
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The results of applying a numerical model of the atmosphere to the problem of locating areas of maximum wind power are presented. Three US coastal regions, of approximately 10 exp 5 km exp 2 area each, are investigated. For each region the spatial distribution of daily average power density (W m exp -2) for the lowest 100 m of the atmosphere is given for the three most prevalent weather regimes. These distributions are then combined to form an estimate of the annual average power density for each region. Comparisons with long-term climatological data at stations within each region show good agreement between model estimated and observed wind power density for two of the three regions studied. (ERA citation 07:043182)

DE82013517 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Comparison of Cross-Path Optical Anemometer Data from ASCOT 1979 and 1980 Experiments.
W. Porch, R. Fritz, R. Hosker, and R. Coulter. Apr 82, 38p UCID-19358, ASCOT-82-1
Contract W-7405-ENG-48
Portions of document are illegible.
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The spatial averaging and sensitivity to low wind speeds associated with optical cross-path wind sensing are shown to be valuable assets in complex terrain wind studies. Optical anemometer paths were located across valleys which channel drainage winds. The optical path component perpendicular to the valley stream flow was used to isolate the drainage wind component. The results from these instruments have been used to determine the timing, strength and extent of the drainage, morning upslope and afternoon seabreeze winds. These data have also been used to determine complex terrain effects on auto-spectral wind variability at a point from a cup-vane anemometer and the effect of this variability on numerical wind field models which include spatial averaging. (ERA citation 07:047977)

DE82015995 PC **A07**/MF **A01**
Automation Industries, Inc., Silver Spring, MD. Vitro Labs. Div.
April 1982 Environmental Data for Sites in the National Solar Data Network.
Apr 82, 127p SOLAR/0010-82/04
Contract AC01-79CS30027
Microfiche only after original copies are exhausted.

Environmental information collected at the sites of the National Solar Data Network is presented in the form of tables for each solar site. The sites are grouped into 12 zones, each of which consists of several adjacent states. The insolation table presents the total, diffuse, direct, maximum, and extraterrestrial radiation for the solar site. It also shows the ratio of total to extraterrestrial radiation as a percent. The temperature table gives the average, daytime, nighttime, maximum, minimum and inlet-water temperatures for the solar site. All of the passive and some of the active solar sites are equipped with wind sensors which provide information for two wind tables furnishing wind speed and direction. For some sites, a humidity table provides relative humidity values for the maximum and minimum humidity for each day. A technical discussion of the instruments and measurements used to obtain these data tables is included.

DE82900715 MF **A01**
Uppsala Univ. (Sweden). Meteorologiska Institutionen.
Acoustic Doppler Measurements for Prospecting of Wind Energy.
S. Salomonsson, and B. Holmgren. 1980, 44p UUIM-64
Portions of this report are illegible.
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Results from Doppler SODAR (sound Detecting and Ranging) measurements of horizontal and vertical winds are discussed. The measurements were carried out during a wind prospecting project that aimed at finding the best location for a wind power station on Gotland, an island in the south-eastern part of Sweden. The Doppler system was rebuilt by two standard SODAR units, primarily designed for vertical monostatic soundings. The Doppler unit consisted essentially of a phase-locked-loop (PLL) circuit. The data were presented on analog 3-channel recorders. The wind velocities derived from the Doppler shift are compared with simultaneous wind measurements from double theodolite pilot balloon trackings. The test shows quite good agreement within the lowest 100 m of the atmosphere. Also a comparison is made between local variation of the boundary-layer dynamics in thermally stable stratification obtained on a SODAR record and simultaneous Doppler measurements of horizontal wind speed and direction at the 60 m level. The influence of the topography on the vertical wind component is demonstrated during some periods of strong horizontal winds. Local variations of vertical temperature structure obtained on SODAR records at two sites, separated about 40 km, in relation to profiles pilot balloon tracking data are discussed. (ERA citation 07:043188)

N82-31824/7 PC **A09**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Chemical Kinetics and Photochemical Data for Use in Stratospheric Modeling: Evaluation Number 5.
W. B. Demore. 15 Jul 82, 193p NAS 1.26:169262, JPL-PUB-82-57, NASA-CR-169262
Contract NAS7-100

Sets of rate constants and photochemical cross sections compiled which were evaluated. The primary application of the data is in the modeling of stratospheric processes on the ozone layer and its possible perturbation by anthropogenic and natural phenomena are emphasized.

N82-31868/4 PC **A09**/MF **A01**
Texas A and M Univ., College Station.
Rawinsonde Sounding Data and Synoptic Conditions for the CCOPE-VAS Experiment, July 1981.
Final Report.
W. K. Henry. Jul 82, 177p NAS 1.26:3589, M-385, NASA-CR-3589
Contract NAS8-31773

During the cooperative convective precipitation experiment, eight times were selected as VISSR atmospheric sounder (VAS) observation periods. A synoptic analysis of the surface and the 850, 700, 500, 300, and 200 maps for those eight periods. The satellite and radar data for those periods are included with the analyses. There were five rawinsonde stations in eastern Montana which made extra soundings for the VAS periods.

N82-31869/2 PC **A03**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Spatial Variability of Precipitation in the North-Northeastern Region of South America Variabilidade Espacial DA Precipitacao NA Regiao Norte-Nordeste DA America Do Sul.
A. D. Moura, and M. T. Kagano. Feb 82, 28p INPE-2318-RPE/402
In Portuguese; English Summary.

The spatial distribution of the deviations from the normal precipitation over tropical South America was investigated using the available data since the beginning of the century. The spatial scale associated with these deviations was established based on dry and wet years for Northeastern Brazil. It was found that, on the average, the NE drought spatial scale is not confined to that region but extends from 35 deg W up to 65 deg W of longitude. The results show that there is an inverse relationship between the NE Brazil and Guyaras rainfall, in accordance with previous results. Also, it was found a direct relationship between the NE rainfall and that of Colombia and Venezuela region.

N82-31870/0 PC **A04**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Forecasting Droughts in the Northeast by the Method of Periodicities: Use and Abuses Previsao de Secas No Nordeste Pelo Metodo das Periodicidades: Uso E Abusos.
C. A. Nobre, H. H. Yanasse, and C. C. F. Yanasse. Mar 82, 62p INPE-2344-RPE/407
In Portuguese; English Summary.

Statistical analysis of Fortaleza, Ceara, Brazil rainfall series is presented (1849 - 1978). Several tests for white noise showed that the series is not uncorrelated at 95% confidence level. Periodicities of approximately 13 and 26 years were found to be statistically significant. A forecasting model based on these periodicities was built. It is seen that the two periodicities explained only 24% of the series' variance. Several limitations of such a forecasting model were discussed. It was concluded that the uncertainties involved in drought forecasting in northeastern Brazil based on this model are high. Therefore it is recommended that these drought forecasts be viewed with great care.

N82-31883/3 PC **A02**/MF **A01**
Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.
Mobile Weatherstation.
H. Hahn, P. Koutny, H. Schwabach, and H. Eisenwagner. Jan 81, 17p OEFZS-4054, EL-66/81

A mobile weather station is described which measures the following parameters: air temperature, relative humidity, wind direction and wind speed. The station consists of three main units the central station METEODAT, the multiplexer and the weather measure tower with the sensors. The measured data are displayed in digital form in the central unit and can be printed on a teletype. The power supply is either 220 Volt ac or 24 Volt dc.

PB83-112649 PC **A06**/MF **A01**
National Research Council, Washington, DC. Climate Research Board.
Toward a U.S. Climate Program Plan. Report of the Workshop to Review the U.S. Climate Program Plans.
Final rept.
May 79, 108p
Contract NSF-C310-TO-380
Sponsored in part by National Oceanic and Atmospheric Administration, Washington, DC.

The report of a workshop reviews the plans of the U.S. Climate Program and describes goals, organization, and management; climatic data, information, and services; research components of the U.S. climate program; impact assessment; international dimensions, appendices include: The National Climate Program Act; Federal Government Climate Plans and Background Documents; and the World Climate Program.

PB83-113043 PC **A05**/MF **A01**
National Research Council, Washington, DC. Climate Research Board.
International Perspectives on the Study of Climate and Society: Report of the International Workshop on Climate Issues, Schloss Laxenburg, Austria, April 24-28, 1978.
Jan 79, 91p
Sponsored in part by Andrew W. Mellon Foundation, New York, and German Marshall Fund of the United States, Washington, DC.

Contents: Summary of principal conclusions and recommendations; the Climatic framework; climate, economics, and planning: Climate and the Developing Countries; Scientific priorities for International climate programs; International programs for the study of climate impacts. Annexes: A Macroeconomic approach to climate; Climate and energy planning; Climate impacts and socioeconomic conditions; How can the climatologist help the developing countries; On the scientific nature and status of the global climate problem.

PB83-114801 PC **A14**/MF **A01**
Texas Advisory Commission on Intergovernmental Relations, Austin.

Mitigating Drought through Weather Modification: Selected Institutional and Meteorological Issues in Texas. Volume 1: Texas Advisory Commission on Intergovernmental Relations.
Final rept. 15 Sep 80-1 Jun 82,
Jay G. Stanford, Stan Kantrowtz, George Bomar, Bob Riggio, and Donald R. Haragan. May 82, 316p
Contract DI-0-07-81-V0155
See also Volume 2, PB83-114819.
Also available in set of 5 reports PC E99, PB83-114793.

Selected institutional and meteorological issues for enhancing Texas' capability to mitigate drought through weather modification, focusing on the governments, climate, geography, and economy of the Edwards area of Central Texas. The study discusses Texas statutory and case law, including the Texas Weather Modification Act, plus related statutes of other states. It explains the Texas Disaster Act and the connections between disaster planning and drought. The report addresses intergovernmental rain augmentation responsibilities and alternative institutional approaches, including past and potential funding sources, funding allocation methods, and ways to monitor drought conditions. The report summarizes the project's three meteorological studies of the Edwards Area: precipitation climatology, radar echo characteristics, and upper-air studies.

PB83-114819 PC **A04/MF A01**
Texas Advisory Commission on Intergovernmental Relations, Austin.
Mitigating Drought through Weather Modification: Selected Institutional and Meteorological Issues in Texas. Volume 2: Radar Echo Characteristics in the Edwards Plateau - Balcones Escarpment Area of Texas.
Final rept. 15 Sep 80-1 Jun 82,
Dennis M. Driscoll. May 82, 59p
Contract DI-0-07-81-V0155
See also Volume 1, PB83-114801, and Volume 3, PB83-114827.
Also available in set of 5 reports PC E99, PB83-114793.

This study reports the characteristics of rain cells (radar echoes) in the southern Edwards Plateau and Balcones Escarpment area of Texas as deduced from PPI photographs, as film, of the WSR-57 (10 cm) radar at Hondo, Texas. The periods analyzed are divided according to whether the aspect considered was initial echo occurrence or all echo occurrence. The former comprises nine very rainy (wet) days, 98 virtually rainless (dry) days, and an additional 103 unclassified days. The latter comprises a total of 699 days, but only 372 of these were fully analyzed because of time constraints. All days are from the convective seasons (April - Sept.) of the years 1973-1980.

PB83-114827 PC **A04/MF A01**
Texas Advisory Commission on Intergovernmental Relations, Austin.
Mitigating Drought through Weather Modification: Selected Institutional and Meteorological Issues in Texas. Volume 3: Precipitation Climatology for the Edwards Plateau Region of Texas.
Final rept. 15 Sep 80-1 Jun 82,
Donald R. Haragan. May 82, 75p
Contract DI-0-07-81-V0155
See also Volume 2, PB83-114819, and Volume 4, PB83-114835.
Also available in set of 5 reports PC E99, PB83-114793.

A precipitation climatology of the Edwards Plateau region of Texas is presented and discussed. The area is characterized by maximum precipitation in May and September with minimum precipitation in winter and early spring. The spatial distribution of average annual precipitation shows an east-west bulge which is probably related to the abrupt rise in elevation along the Balcones Escarpment. Maps of mean monthly precipitation show evidence of topographic effects on several scales ranging from extremely localized to broad-scale features along the escarpment. During the warm season, rainfall occurs as scattered showers or thunderstorms characteristic of localized convection. Heavy precipitation in late summer and early fall is due to tropical activity moving west and north from the Gulf of Mexico.

PB83-114835 PC **A05/MF A01**
Texas Advisory Commission on Intergovernmental Relations, Austin.
Mitigating Drought through Weather Modification: Selected Institutional and Meteorological Issues in Texas. Volume 4: An Objective Study of the Upper-Air Conditions Relating to Precipitation Over the Southeastern Section of the Edwards Plateau in Texas.
Final rept. 15 Sep 80-1 Jun 82,
Walter K. Henry, Tom Utley, and John Lipe. May 82, 85p
Contract DI-0-07-81-V0155
See also Volume 3, PB83-114827, and Volume 5, PB83-114843.
Also available in set of 5 reports PC E99, PB83-114793.

The purpose of this study is to identify and quantify the upper air meteorological variables which are associated with rainfall over the southeastern portion of the Edwards Plateau in Texas. Using the six summer months of eight years (1973-80) of data from these rawinsonde stations, eighteen parameters were computed for each observation period. These values were compared with the daily rainfall as reported by approximately eighty rainfall stations within the triangle. Regression equations were formulated relating the eighteen parameters to the average areal rainfall amount. A method is presented to forecast the days (about 50% of the days) when no seedable rain will occur.

PB83-114843 PC **A25/MF A01**
Texas Advisory Commission on Intergovernmental Relations, Austin.
Mitigating Drought through Weather Modification: Selected Institutional and Meteorological Issues in Texas. Volume 5: An Objective Study of the Upper-Air Conditions Relating to Precipitation Over the Southeastern Section of the Edwards Plateau in Texas.
Final rept. 15 Sep 80-1 Jun 82,
Walter K. Henry. May 82, 583p
Contract DI-0-07-81-V0155
See also Volume 4, PB83-114835.
Also available in set of 5 reports PC E99, PB83-114793.

Contents of the appendixes are: Computations; Normal monthly and annual rainfall maps for Texas showing increased rainfall in the Edwards Plateau area; Climate data; Wind data; Acronyms and symbols used in report.

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A119 477/8 PC **A02/MF A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
Technology Transfer in the Navy: The Historical Background.
Final rept. Mar-Jun 82,
David Kite Allison. Sep 82, 25p Rept no. DTNSRDC-82/091

This report reviews technology transfer in light of the Stevenson-Wydler Technology Innovation Act of 1980. Following a brief introduction, a section on Definitions explains the several meanings that the phrase technology transfer now carries in policy discussions. The next section, on 'Passive Technology Transfer,' reviews traditional Department of Defense scientific and technical information programs that relate to technology transfer. A section on Military Industrial Transfer examines technology transfer from the Defense Department to private industry, especially to defense contractors. A section on The Stevenson-Wydler Act and Active Technology Transfer describes the principal provisions of the new act and why Congress passed it. The next two sections, on NASA's Technology Transfer Program and The Federal Laboratory Consortium outline the two existing Government programs Congress relied upon in developing ideas for the new law. A section on Implementation of the Stevenson-Wydler Act, discusses several important issues that must be considered by Navy laboratory management as the new law is put into effect in the Navy. Congress, in passing the Stevenson-Wydler Act, did not fully consider what relationship the new technology transfer programs it was requiring in the Executive Branch should bear to existing programs with similar purposes. If the public interest is to be served, the report argues, the Navy must consciously and carefully determine the proper nature of this relaitonship.

AD-A119 492/7 PC **A02/MF A01**
Washington Headquarters Services (DOD), DC. Directorate for Information Operations and Reports.
Department of Defense Catalog of FY 1981-FY 1982 DIOR Reports.
Apr 82, 25p

Contents: Financial Management Data Publications; Logistics Data Publications; Manpower Data Publications; and Prime Contract Data Publications.

AD-A119 537/9 PC **A03/MF A01**
Texas Univ. at Austin. Center for Cybernetic Studies.
A Chance-Constrained Approach to Bank Dynamic Balance Sheet Management.
Research rept.,
A. Charnes, J. Gallegos, and S. Yao. May 82, 37p
Rept no. CCS-RR-428
Contract N00014-82-K-0295

The dynamic balance sheet management model formulated deterministically by Chambers and Charnes was extended stochastically by Cohen and Thore to a two-stage LPU2 model. This paper develops a chance-constrained model which compares well with the Cohen and Thore example but in addition is easily extendable to formulations of realistic size, as the C-T model is not, and with the availability of dual evaluators. (Author)

AD-A119 617/9 PC **A03/MF A01**
Clemson Univ., SC. Dept. of Industrial Management.
Applied Risk Analysis with Dependence Among Cost Components.
Final rept.,
George H. Worm. Nov 81, 48p
Contract F33615-81-C-5138

The assessment of uncertainties in component costs, a method of combining these uncertainties for determining the total cost uncertainty, and a method of presentation for risk analysis results are discussed in this report. An extension of the method of statistical risk analysis which uses the Weibul distribution and the method of moments is developed for incorporating covariance between component costs. (Author)

AD-A119 736/7 PC **A04/MF A01**
Army War Coll., Carlisle Barracks, PA.
Information Engineering.
Student concept paper,
William W. Witt. 1982, 75p

This paper explains the critical nature of information flow in organizations using a 'Living Systems' model. It calls for new ways to manage information flow with a recognition that the 'chain of command' cannot be the sole flow channel if effectiveness is the desired outcome. Also discussed is leadership in the context of 'turning information into action'.(Author)

AD-A119 738/3 PC **A19/MF A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Analytical Review: A Comparison of Procedures and Techniques Used in Auditing.
Doctoral thesis,
James Richard Coakley. Aug 82, 443p Rept no. AFIT/CI/NR/82-50D

This study compares some of the analytical review procedures which are currently used by practicing auditors. The comparison is based on the measured efficiency and effectiveness of the analytical review procedures applied to actual financial data. The measure of efficiency is the type I error rate and the meas-

ure of effectiveness is the type II error rate. A simulation process is used to measure the type I and type II error rates of the alternative analytical review procedures. Personal interviews are conducted with each participating auditor to derive the needed information. The simulation process applies each of the analytical review procedures to actual financial data seeded with monetary errors of various size and various monthly distributions across the account balances. The results of the simulation identify specific analytical review procedures which are considered most efficient for a specified level of effectiveness. The major finding of this study is that the precision currently used with analytical review procedures may be too restrictive. Many investigations are signalled by the analytical review procedures as a result of normal fluctuations in the financial data, prior to the introduction of monetary error into the account balances. The results of the study suggest that analytical review procedures may not provide sufficient audit assurance when applied as substantive tests.

AD-A119 795/3 PC **A18**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Summary of the Naval Postgraduate School Research Program.
Rept. for 1 Oct 80-30 Sep 81.
May 82, 423p Rept no. NPS-012-82-004PR

This report contains 224 summaries on research projects which were carried out under funding to the Naval Postgraduate School Research Program. This research was carried out in the areas of Computer Science, Mathematics, Administrative Sciences, Operations Research, National Security Affairs, Physics and Chemistry, Electrical Engineering, Meteorology, Aeronautics, Oceanography and Mechanical Engineering.

DE82009617 MF **A01**
Department of Energy, Washington, DC. Assistant Secretary for Management and Administration.
History of the Energy Research and Development Administration.
A. L. Buck. Mar 82, 29p DOE/ES-0001
Portions of document are illegible.
Available in microfiche only.

Congress created the Energy Research and Development Administration on October 11, 1974 in response to the Nation's growing need for additional sources of energy. The new agency would coordinate energy programs formerly scattered among many federal agencies, and serve as the focus point for a major effort by the Federal Government to expand energy research and development efforts. New ways to conserve existing supplies as well as the commercial demonstration of new technologies would hopefully be the fruit of the Government's first significant effort to amalgamate energy resource development programs. This history briefly summarizes the accomplishments of the agency. (ERA citation 07:047073)

DE82011166 MF **A01**
American Management Systems, Inc., Arlington, VA.
Chief Financial Officer's Task Force on Rationing Feasibility, Cost and Schedule. Final Report.
5 Mar 80, 119p DOE/AD/14013-T2
Contract AC01-80AD14013
Portions of this report are illegible.
Best available copy from document source. Available in microfiche only.

The purpose of this memorandum is to report our realistic assessment of the feasibility, cost, and time frame for bringing a rationing program to 90-day readiness. The basic aspects of the nature of the rationing plan are discussed. The plan has been changed in several respects in response to comments from the Congress, the general public and the ECC, since the previous version was rejected by the Congress in May 1979. Three changes in particular impact the preimplementation process: The range of entities accorded status as priority firms has increased to cover such groups as telecommunications firms and for-hire delivery firms; All firms (not just priority users) are alloted rights for a percentage of their historical gasoline usage; States have more influence on the division of the total state supply between state reserves and vehicle allotments. The rationing plan, is described on a chart depicting the interaction of the principal components is included. The rationing process starts when checks for coupons are sent to owners of registered vehicles. The biggest single problem area appears to be delivering these checks into the hands of the vehicle registrants who are entitled to them. (ERA citation 07:043863)

DE82011562 PC **A03**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD.
Tight Gas Research and Development: The Industry Perspective.
J. P. Brashear, L. E. Elkins, and M. R. Haas. Feb 82, 41p DOE/ET/12072-T11, DOE/FE-0017
Contract AC01-78ET12072
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Low permeability gas reservoirs are abundant in the US. Economic recovery of the gas in these formations requires reservoir stimulation, usually massive hydraulic fracturing. Significant investigations of tight gas sands by the National Petroleum Council, Lewin and Associates, and the Gas Research Institute have agreed that, although some formations can be profitably produced with existing technology, improved reservoir diagnostic and stimulation techniques are required to realize the full potential of the resource. Most major operators and well-service companies conduct research and development to improve tight gas technology. A survey of tight gas research managers in eight companies was conducted to determine their R and D priorities and the constraints under which they operate. The responses of the R and D managers showed a high degree of consensus on tight gas R and D objectives. The representatives of six operating and two service companies stated that they prefer R and D that produces high payoffs in the near term, with low-to-medium risk of R and D failure. Industry tends to focus current R and D on measurement and prediction of fracture geometry in the lower-risk blanket-type formations. Despite the presence of price incentives for production of tight gas and the potential of high return, the constraints on available personnel and funds for R and D limit industry's willingness to conduct the long-term, high-risk R and D needed to produce the lenticular resource. The industry R and D personnel interviewed were familiar with, and generally endorse, those long-range and high-risk objectives and priorities of the Federal tight gas research program that complement university and industry efforts. This report presents the survey results in three areas: tight gas R and D objectives and priorities; economic and organizational decisionmaking criteria; and industry attitude toward the Federal tight gas R and D program. (ERA citation 07:042340)

DE82011589 PC **A02**/MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.
Application of Systems Engineering Techniques (Reliability, Availability, Maintainability, and Dollars) to the Gas Centrifuge Enrichment Plant.
J. G. Boylan, and R. C. DeLozier. Jan 82, 19p K/PO-780, CONF-820615-1
Contract W-7405-ENG-26
26. American Association of Cost Engineers annual meeting, Houston, TX, USA, 27 Jun 1982.

The systems engineering function for the Gas Centrifuge Enrichment Plant (GCEP) covers system requirements definition, analyses, verification, technical reviews, and other system efforts necessary to assure good balance of performance, safety, cost, and scheduling. The systems engineering function will support the design, installation, start-up, and operational phases of GCEP. The principal objectives of the systems engineering function are to: assure that the system requirements of the GCEP process are adequately specified and documented and that due consideration and emphasis are given to all aspects of the project; provide system analyses of the designs as they progress to assure that system requirements are met and that GCEP interfaces are compatible; assist in the definition of programs for the necessary and sufficient verification of GCEP systems; and integrate reliability, maintainability, logistics, safety, producibility, and other related specialties into a total system effort. This paper addresses the GCEP reliability, availability, maintainability, and dollars (RAM dollars) analyses which are the primary systems engineering tools for the development and implementation of trade-off studies. These studies are basic to reaching cost-effective project decisions. The steps necessary to achieve optimum cost-effective design are shown. (ERA citation 07:045867)

DE82013129 MF **A01**
Argonne National Lab., IL.
Project Planning and Reporting System Description.
A. R. Valentino, and J. J. English. Jan 82, 69p ANL/ENG-PMSO-01
Contract W-31-109-ENG-38
Portions of document are illegible.
Available in microfiche only.

This document, prepared for the Argonne National Laboratory (ANL) Office of the Director by the Project Management Systems Office of the Engineering Division as part of the Project Management Improvement Program, is intended to assist ANL project managers in preparing project plans and reports. It is a guide only and is not intended to describe an official or required set of procedures. It briefly reviews project planning and reporting tools and makes recommendations for large and small construction and research projects.

DE82013212 MF **A01**
Donovan, Hamester and Rattien, Inc., Washington, DC.
Private Sector Outlook: Will the Private Sector Develop Existing and New Conservation Technologies in a Timely Fashion on its Own.
1979, 17p DOE/CS/20059-T17
Contract AC01-78CS20059
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Decisions and arguments made by the private sector on energy conservation investment and research and development (R and D) are discussed. Arguments (applicable to the industrial intermediate goods sector, to appliances, to community systems, and to the transportation sector) as to whether the private sector would allocate as much funding to energy conservation R and D as would be socially desirable are outlined.

DE82903607 MF **A01**
Tennessee Valley Authority, Chattanooga. Office of Natural Resources.
Operation of TVA Reservoirs. Annual 1979.
Apr 82, 201p TVA/ONR/WR-80/1
Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

Data for 1979 on the operation of TVA reservoirs for flood control, power generation and navigational purposes are reported. The operation of TVA, ALCOA, and Cumberland Basin reservoirs that were scheduled daily by Reservoir Operations Branch personnel during calendar year 1979 is described. These include all TVA reservoirs, eight reservoirs in the Cumberland River Basin owned by the US Army, Corps of Engineers, and six reservoirs in the Tennessee River Basin owned by ALCOA. In addition, storage and flow computations include Walters Reservoir, operated by Carolina Power and Light Company; and Woods Reservoir, operated by the US Air Force. Any reference in this report to all reservoirs in the Tennessee or Cumberland River Basins refer to these specific reservoirs. Tabulated data are included on: reservation elevation and storage volume; turbine and gate discharges; and head water elevation.

N82-32193/6 PC **A04**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Evaluation of Organization Development (OD). A Literature Review.
A. Philips. May 82, 67p FOA-C-55054-H3

Literature on organiztion development (OD) evaluation was reviewed. The selection of the purpose of, and the audience for the evaluation are discussed. The formulation and selection of evaluation criteria and the selection of evaluation variables are considered. Methodologies, e.g., questionnaires, interviews, are outlined. The choice of an optimal evaluation design is treated. Failures and defects in OD evaluations are attributed to the use of positivistic, functionalistic, science standards. Action science and hermenentical approaches are suggested as alternatie means to ensure the validity and utility of OD evaluations.

PB83-110353 PC **A03**/MF **A01**
Economic Research Service, Washington, DC. Economic Development Div.

Evaluation of Local Decisions Project,
John A. Kuehn, and Marlys K. Nelson. Aug 82, 32p AGES-820729

The Local Decisions Project developed guides to assist local officials in making more informed decisions. Project personnel worked directly with 20 Ozark communities in developing 10 new research topics. Many Ozark communities reapplied these 10 studies and studies previously completed in the Great Plains. Eight other programs were identified which partially depended upon or were similar to the Local Decisions Project.

PB83-110502 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Office of the Comptroller General.
Major Financial Management Improvements Needed at Department of Energy.
15 Sep 82, 94p GAO/OCG-82-1

GAO's review of several aspects of the Department of Energy's financial management activities disclosed significant weaknesses in each of the areas examined, including internal controls, cash and property management, and contract administration. The extent of the identified weaknesses makes the Department vulnerable to fraud, waste, and abuse, and unable to assure that its financial systems are producing reliable data. The Department has initiated corrective actions in the areas of weaknesses brought to its attention by GAO. However, much more needs to be done to improve financial management, particularly in the Department's field organizations. The report recommends specific corrective actions.

PB83-110510 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Program Analysis Div.
Including User Charges in the General Revenue Sharing Formulas Could Broaden the Measure of Revenue Effort.
2 Sep 82, 37p GAO/PAD-82-23, B-206915

No changes have been made to the formulas for distributing general revenue sharing funds since the program was passed in 1972. One component of the formulas, the tax effort measure, has been criticized as a limited and uneven measure of the burden on residents in providing public services. GAO analysis shows that the tax effort measure could be made more comprehensive by including a measure of user charges in the formulas.

PB83-111575 PC **E13**/MF **E13**
Commission of the European Communities, Luxembourg.
Les Obstacles a l'Innovation dans les Pays de la Communaute Europeenne (Obstacles to Innovation in the Countries of the European Community),
A. Piatier. c1981, 352p EUR-7528-FR/EN
Text in French and English.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

Barriers to innovation arising from the action of public authorities have been studied with particular emphasis on those which affect medium-sized and small businesses. Investigation methods have varied from country to country: the UK, Ireland, Denmark, Belgium and Luxembourg carrying out direct surveys of firms, and Germany, the Netherlands, Italy and France giving priority to expert opinion or the results of previous research. Compatibility of the different approaches has been obtained by basing the general report on national matrix summaries. Recommendations made include financial and taxational measures, removal of bureaucratic barriers and improvement of information dissemination. Actions which could be taken at EEC level and at national level are discussed.

PB83-111864 PC**$173.00**/MF**$173.00**
Construction Industry Research and Information Association, London (England).
Target and Cost-Reimbursable Construction Contracts. Parts A, B, and C,
J. G. Perry, P. A. Thompson, and M. Wright. c1982, 117p CIRIA-85, ISBN-08617-174-4
Also pub. in ISSN-0305-408X.

The report puts forward principles for a consistent approach to the management and financial aspects of the use of target or cost-reimbursible contracts. Part A: a study of their use and implications, discusses when to use cost-reimbursible contracts, the advantages and difficulties arising, the methods of introducing competition in tendering, targets and incentives. Part B: management and financial implications, considers in detail contract strategy, finance, administration and management in relation to target and cost-reimbursible contracts. Part C: preparation of contract conditions, examines the requirements for contract conditions suitable for target and cost-reimbursible contracts. It gives guidance on the clauses of the ICE Conditions of Contract (fifth edition) which may need adaptation, and the breakdown of costs.

PB83-112615 PC **A07**/MF **A01**
Unified Industries, Inc., Springfield, VA.
A Case Study of the Closing of a Federal Activity.
Final rept. Jul 81-Sep 82,
W. Thomas Callahan, and Wilson V. Varga. 30 Sep 82, 131p EPA-550/9-82-501
Contract EPA-68-01-6418

Federal activities can close without resort to reduction-in-force (RIF) procedures and avoid the costs and personnel turbulence attendant to a RIF. Phaseout, rather than precipitous closing, can also avoid loss of property and diminution of respect for the national government. This report documents in detail the steps taken by the managers of one Federal activity that conducted a gradual phaseout. Emphasis is placed on personnel outplacement, the bolstering of state programs to carry on the Federal work that is ending, retirement of program records and technical information, fulfillment of regulatory requirements, disposition and security of property, and assurance of fiscal accountability. Discussions are illustrated with specimens of documents that can be adapted for use by other activities that close.

PB83-114413 PC **A04**/MF **A01**
Illinois Commission on Intergovernmental Cooperation, Springfield.
A Collaborative Network for Supporting Decision-Making and Policy-Making in State Legislatures. Technical Summary.
Final project rept.,
John Lattimer, and Daniel Alpert. Jun 82, 62p NSF/ISP-82024
Grant NSF-ISP78-19659

A project is discussed that is designed to help legislators and their staffs improve their capabilities in formulating legislation by accessing a multiple-purpose, computer-based network for relevant information and a network of knowledgeable researchers. Project accomplishments are summarized, including: the development of an interactive, multiple-function information system for policy analysis; the illumination of major policy issues through collaboration with researchers; the assessment of the technical and economic feasibility of the PLATO system and others for applications to collaborative policy analysis; and the facilitation of the development of collaborative networks in other states. INTERFACE, a multi-purpose set of computer programs utilizing the PLATO system, is described. Two program packages are discussed. The first, Stateaid, makes use of the INTERFACE system, incorporating data for more than 1,000 school districts, and the second, Edudata, presents comparative data on educational variables for all 50 states.

PB83-114959 PC **A07**/MF **A01**
National Association of Counties, Washington, DC.
Priority Problem Areas and R and D Needs of County Government.
1979, 141p NSF/RA-790769
Grant NSF-ISP78-11665

Priority problems and needs of county governments are enumerated and constraints, solutions, and expected results are given. Discussions focus on the following needs: more effective ways to exchange personnel, equipment, service, and costs among various levels of local government; broad-based productivity improvement programs; improved methods of taxation so that counties and their citizens may receive the most for their tax dollars; uniform financial accounting and reporting systems based on accepted general accounting principles; improved and more cost-effective bridge and road repair materials and methods; reasonable and cost-effective methods of recovering energy and resources from solid waste; tools for monitoring vehicle use, fuel consumption, and maintenance requirements; techniques for auditing energy consumption in public buildings; more sophisticated and innovative alternative approaches for training fire fighters; and rural health care programs. Appendixes include an index and listing of problem/need statements, a list of participants who provided input to the study, and the original questionnaire used to identify problems and needs of county governments.

PB83-115097 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Accounting and Financial Management Div.
Strong Central Management of Office Automation Will Boost Productivity.
21 Sep 82, 52p GAO/AFMD-82-54, B-208482

Office automation has the potential to improve the productivity of Federal managers, professionals, and clerical workers. Federal agencies plan to spend several hundred million dollars on this technology in the next few years. However, the lack of strong central management and effective guidance has resulted in the development of office automation systems that duplicate existing systems, are not compatible with other systems, and are not cost effective. GAO believes that to reap the benefits without wasting resources, agencies should establish strong, central management of office automation with better guidance from the General Services Administration.

PB83-852525 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Operations Research Applied to Inventory Control. June, 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 121p
Supersedes PB80-860117.

This bibliography contains citations concerning the application of systems analysis and operations research to inventory management and material control programs. Utilization by industry, government, military, and public and private institutions is included. Analysis of critical and extreme demand values are discussed. (This updated bibliography contains 100 citations, 35 of which are new entries to the previous edition.)

5B. Documentation and Information Technology

AD-A119 549/4 PC **A99**/MF **A01**
Air Intelligence Group (7602nd), APO San Francisco 96263.
Chinese-English Automation and Computer Technology Dictionary, Volume 2.
Aug 80, 789p
See also Volume 1, AD-A103 084.

The Automation and Computer Technology Dictionary is the fifth in a series of Chinese-English technical dictionaries but is the second volume produced in the automation and computer technology field. The purpose of the series is to provide rapid reference tools for translators, abstractors, and research analysts concerned with scientific and technical materials from Mainland China. This dictionary will be published in two volumes, containing about 40,000 terms selected from the latest edition of the English-Chinese Glossary of Computer Technology, Peking, 1977; and the English-Chinese Glossary of Automation and Detection Instruments, Peking, 1974. The terms included relate not only to overall design of computer systems, logic design, computer-aided design, storage, data processing, software, machine translation, automation design, automatic control, servosystems, kinematics, remote control, analog machines, simulators, engineering cybernetics, detection instruments, etc., but also incorporate vocabulary from the basic sciences and the auxiliary technologies closely associated with automation and computer science, such as microelectronics, integrated circuit, semiconductors, computational mathematics, chemistry, etc.

AD-A119 757/3 PC **A12**/MF **A01**
Naval Postgraduate School, Monterey, CA.

Recent Naval Postgraduate School Publications.
Summary rept. FY 80,
William M. Tolles. May 81, 272p Rept no. NPS-012-81-005PR

This publication contains a listing for each faculty member from each department indicating the conference presentations, contributions to books, published papers and technical reports and notes.

AD-A119 796/1 PC **A14**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Recent Naval Postgraduate School Publications.
Summary rept. for FY 1981.
Apr 82, 312p Rept no. NPS-012-82-002PR

This publication contains a listing for each faculty member from each department indicating the conference presentations, contributions to books, published papers and technical reports and notes. The research projects were carried out in the areas of Computer Science, Mathematics, Administrative Sciences, Operations Research, National Security Affairs, Physics and Chemistry, Electical Engineering, Meteorology, Aeronautics, Oceanography, and Machine Engineering.

AD-A119 797/9 PC **A19**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Compilation of Abstracts of Theses Submitted by Candidates for Degrees.
Rept. for 1 Oct 80-30 Sep 81.
May 82, 436p Rept no. NPS-012-82-003PR

This publication contains abstracts of theses submitted for Doctor of Philosophy, Aeronautical Engineer, Electrical Engineer, Master of Science degrees and Master of Arts degrees.

AD-A119 806/8 PC **A07**/MF **A01**
Air Force Academy, CO.
Discovery: Faculty Publications and Presentations, Fiscal Year 1981.
Research publication,
Clayton V. Stewart, and John A. Stibravy. 1982, 144p

Contents: Aeronautics, Astronautics and Computer Science, Behavioral Sciences and Leadership, Biology, Chemistry, Civil Engineering, Economics, Electrical Engineering, English, Foreign Languages, Office of Instruction for Geography, History, Law, Management, Mathematical Sciences, Philosphy and Fine Arts, Physics, and Political Science.

DE82011468 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Information Data Bases at the Transportation Technology Center.
E. L. Emerson. 1982, 8p SAND-81-2549C
Contract AC04-76DP00789

A description is presented of the Transportation Technology Center (TTC) at Sandia National Laboratories, a component of the Department of Energy's Nuclear Waste Management Program. The center provides technical management and support for those programs related to the transportation of nuclear materials. A very important support function is the ability to provide information upon request. In 1979 a special collections library was established in the TTC and work was started on several of the information data bases. Today the TTC has six information collections in computerized data bases. These are described. Persons to contact for information concerning each of the following data bases are listed. The data bases are: Nuclear Material Transportation Incidents; Radioactive Materials Packaging; Legislative and Regulatory Information System; Research in Progress; Bibliographic Collection; and Transportation Technical Environmental Information. (ERA citation 07:045895)

DE82011785 PC **A06**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Pacific Northwest Laboratory Annual Report for 1981 to the DOE Office of Energy Research. Part 4. Physical Sciences.
J. M. Nielsen. Feb 82, 109p PNL-4100-Pt.4
Contract AC06-76RL01830
Microfiche only after original copies are exhausted.

Separate abstracts were prepared for the 13 reports in this 1981 annual report from Battelle Pacific Northwest Laboratory which deals with the physical sciences. (ERA citation 07:042255)

DE82012596 MF **A01**
Department of Energy, Washington, DC. Assistant General Counsel for Patents.
Guidelines for the Acquisition of Technical Data (GATD) Handbook.
1978, 69p DOE/TIC-4625
Microfiche copies only.

This Handbook complements the Uniform Contractor Reporting System (UCRS) and provides guidelines for acquiring technical data under contracts, agreements or other arrangements. It does not encompass collection of energy information for purely regulatory purposes. The Handbook has been developed as a working tool to assist management, program and staff personnel in determining technical data needs and acquiring technical data in the context of the DOE data policy.

DE82013510 PC **A04**/MF **A01**
Mid-American Solar Energy Complex, Minneapolis, MN.
MASEC Corporation and the Mid-American Solar Energy Complex. Final Report, 1 May 1978-28 December 1981.
J. E. Mortison, and M. A. Hohmann. Mar 82, 70p
MASEC-R-82-002
Contract AC02-79CS30150

The mission of the Mid-American Solar Energy Complex (MASEC), to put into action commercialization programs in solar energy technologies, is described. The structure of the MASEC organization, how it was funded, the services that were provided, and the various solar commercialization programs that were provided are discussed.

DE82013513 PC **A10**/MF **A01**
Oak Ridge National Lab., TN.
Environmental Sciences Division Annual Progress Report for Period Ending September 30, 1981.
S. I. Auerbach, and D. E. Reichle. Apr 82, 222p
ORNL-5900
Microfiche only after original copies are exhausted.

Research programs from the following sections and programs are summarized: aquatic ecology, environmental resources, earth sciences, terrestrial ecology, advanced fossil energy program, toxic substances program, environmental impacts program, biomass, low-level waste research and development program, US DOE low-level waste management program, and waste isolation program.

ED-197 751 Not available NTIS
American Foundation for the Blind, New York.
Characteristics, Activities and Needs of People with Limitatins in Reading Print. Volume 2.
Marvin Berkowitz. 1979, 686p
Contract LC-1283
Sponsored in part by National Library Service for the Blind and Physically Handicapped, Washington, DC.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This segment of a series of studies to ascertain the degree to which visually impaired persons use the Library of Congress National Library Service for the blind and physically handicapped (NLS) focuses on the characteristics of the potential user population. Data are presented on the following topics: (1) the framework for examining the utilization of the NLS, (2) size and distribution of the household population with print limitations, (3) the analysis and impact of limitations on the process of reading, (4) demographic and social characteristics of the visually disabled, (5) activities and information seeking behavior of the target group, (6) reading habits of persons with print limitations, (7) awareness and utilization of the NLS program, and (8) satisfaction with the NLS program. The bibliography lists 290 sources.

NUREG/CR-2840 PC **A22**/MF **A01**
National Oceanic and Atmospheric Administration, Honolulu, HI. International Tsunami Information Center.
Annotated Tsunami Bibliography 1962-1976,
G. Pararas-Carayannis, B. Dong, and R. Farmer. Aug 82, 507p

This compilation contains annotated citations to nearly 3,000 tsunami-related publications from 1962 to 1976 in English and several other languages. The foreign-language citations have English titles and abstracts.

N82-32058/1 PC **A12**/MF **A01**
Alabama Univ. in Huntsville. School of Science and Engineering.
UAH/NASA Workshop on Fluids Experiment System.
J. Hendricks, and B. Askins. 1979, 261p NAS 1.15:82492, NASA-TM-82492
Proceedings of Workshop in Huntsville, Ala., 11-12 Jul. 1979.

No abstract available.

N82-32195/1 PC **A07**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
System for Retrieving Documentary Data Sistema de Recuperacao de Dados Documentarios.
M.S. Thesis.
S. D. Barcellos. Feb 82, 136p INPE-2312-TDL/076
In Portuguese; English Summary.

Synbax and semantics for a query language are proposed. The construction of an information retrieval system based on this language is discussed. An approximation of the time and space complexities of such a system and an example of batch execution are given.

N82-32206/6 PC **A03**/MF **A01**
Centre National de Recherches de l'Espace, Brussels (Belgium).
Space Research in Belgium.
Annual Report, 1981.
1982, 32p
Sponsored in Part by Academie Royale de Belgique Koninklijke Academie van Belgiee. Presented at 24TH Cospar Plenary Meeting, Ottawa, 17 May-2 Jun. 1982.

Research concerning space aeronomy, astrophysics, astronomy, space geodesy, metallurgy, and meteorology is summarized. Stratospheric ions, atmospheric structure, plasmapause formation, and solar wind plasma were studied. The interaction of energetic electrons with the Jupiter and Saturn atmospheres, the solar X-ray spectrum, and Beta Cephei variable stars were investigated. The solar constant and the Earth radiation budget were examined.

N82-32251/2 PC **A04**
Royal Norwegian Council for Scientific and Industrial Research, Oslo. .
Space Activity in Norway.
Annual Report, 1981.
A. Gundersen, J. A. Holtet, and A. L. Ruud. Mar 82, 56p SAD-97-T, ISSN-82-7224-172-2
Presented to 24TH Cospar Plenary Meeting, Ottawa, 17 May-3 Jun. 1982. Original Contains Color Illustrations.

Norwegian research in space physics, astrophysics, and life science is summarized. Participation in ESA remote sensing, satellite navigation and communication, SAR data processing and maritime search and rescue projects is outlined. Applications of satellite systems in oceanographic, geographic, geological, and meteorological research are described.

N82-32252/0 PC **A03**/MF **A01**
Royal Society, London (England).
United Kingdom Report on Space Research.
Annual Report, 1980-1981.
1982, 50p
Presented at 24TH Cospar Plenary Meeting, Ottawa, 17 May-3 Jun. 1982.

British university and research institute involvement in European and NASA space programs is described. Astronomy, remote sensing, atmospheric investigation, and orbit determination projects are summarized.

N82-32253/8 PC **A02**/MF **A01**
Austrian Solar and Space Agency, Vienna.
Space Activity in Austria.
Annual Report, 1980/81.
F. Steinhauser, and E. Mondre. Jun 81, 23p
Presented at 24TH Cospar Plenary Meeting, Ottawa, 17 May-3 Jun. 1982.

Austrian participation in the ESA Spacelab program and telecommunications projects is summarized. Remote sensing activities, atmosphere investigations (ionospheric electron content, magnetopause shape studies), and satellite meteorology, astronomy, and geology programs are described.

N82-32254/6 PC **A02**/MF **A01**
Akademiet for de Tekniske Videnskaber, Copenhagen (Denmark).
Space Research in Denmark.
Annual Report, 1980-1981.
1982, 12p
Presented at 24TH Cospar Plenary Meeting, Ottawa, 17 May-2 Jun. 1982.

Danish participation in ESA programs, and research in astrophysics, X-ray astronomy, geophysics, plasmas, and geodesy are summarized. High energy cosmic rays, the Earth's magnetic field auroras, particle precipitation, analog weather images, and the Earth's gravity field were studied.

N82-32255/3 PC **A03**/MF **A01**
Swedish Board for Space Activities, Solna.
Space Research in Sweden.
Annual Report, 1981.
K. Fredga. 1982, 48p
Presented at 24TH Cospar Plenary Meeting, Ottawa, 17 May-2 Jun. 1982.

Swedish participation in ESA programs, and research in magnetospheric and ionospheric physics, astrophysics, meteorology, astrophysics, material sciences, and remote sensing are summarized. Charged particles and atmospheric electric and magnetic fields were measured. Solar and stellar UV radiation were studied. Metal solidification in zero gravity and diffusion in liquid metals were investigated.

PB82-927917 PC **E02**
Central Intelligence Agency, Washington, DC.
Socialist Republic of Vietnam: Party Structure.
Wall chart.
Jul 82, 14p CR-82-13704
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-927900.

The chart shows that party organization was altered as a result of recent party congress; it includes photos of Politburo members.

PB83-111534 PC **E03**/MF **E03**
Commission of the European Communities, Luxembourg.
Report on the Activities of the Committee for Information and Documentation on Science and Technology of the European Communities (4th) (1978-80).
c1982, 40p EUR-7658-EN, ISBN-92-825-2800-5
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

Achievements of the second three-year plan of action in the field of scientific and technological information and documentation (1978-80) are reviewed. During this period Euronet-DIANE was inaugurated and by the end of 1980 was providing access to 150 data banks and bases with about 1000 regular users. One of the major objectives has been to stimulate the development of a healthy and prosperous Community information market.

PB83-112193 PC **A02**/MF **A01**
Executive Office of the President, Washington, DC. Office of Administration.
Publications of the Executive Office of the President, January 20, 1981-September 30, 1982.
1 Oct 82, 5p
See also PB82-170549.

The bibliography lists the publications issued by the components of the Executive Office of the President, and available for sale to the public.

PB83-112672 PC **A06**/MF **A01**
National Research Council, Washington, DC.
Toward the Electronic Office.
Final rept.
Jul 80, 111p
Contract NB80-NAGE-8684
Proceedings of a symposium held at the National Academy of Sciences, Washington, DC. on June 23, 1980.

The report contains the proceedings of a symposium on integrated, computer-based office systems addressing three themes: (1) productivity, cost effectiveness, efficiency, and correct uses and applications of information in office environments; (2) organization and operation of offices to take advantage of all the capabilities of electronic information systems, including making the workplace more interesting and enjoyable; and (3) top-down systems planning. Eight papers from universities, manufacturers, industrial and government users are discussed.

5C. Economics

AD-A119 631/0 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. Dept. of Statistics.
On the Property of Dullness of Pareto Distribution.
Technical rept.,
Wing-Yue Wong. Jul 82, 16p Rept no. TR-82-16
Contract N00014-75-C-0455

In the analysis of income distribution, it has been observed that the true income is usually underreported. In this paper we study the statistical properties of reported incomes through a multiplicative underreported model. The concept of 'locally nearly dullness' of the reported income is introduced and studied. The above property of dullness has been used to characterize the Pareto distribution for the problem of reported incomes. (Author)

DE82007930 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Assistant Secretary for Conservation and Renewable Energy.
Prospects for Foreign Applications of Wind-Energy Systems. Preliminary Report in Response to Public Law 96-345.
4 Nov 81, 18p DOE/NBM-1005
Portions of document are illegible.

Potential foreign applications were identified, and then select specific systems which would most closely match the applications requirements were selected from a list of representative US wind energy systems. The energy situation of each of 155 countries and 29 territories was reviewed. Wind resource availability for each country was assessed from existing data sources. The export potential was determined by analyzing a country's applications requirements, cost of alternative energy, financial condition, interest in the development of renewable energy technologies, and level of indigenous competition. Results are summarized. (ERA citation 07:053578)

DE82011467 PC **A07**/MF **A01**
Argonne National Lab., IL.
Techniques for Preliminary Market Analysis in Feasibility Studies of District Heating and Cooling Systems.
N. F. Kron, Jr. Oct 81, 147p ANL/CNSV-TM-90
Contract W-31-109-ENG-38
Portions of document are illegible.
Microfiche only after original copies are exhausted.

A program aimed at increasing the application of district heating and cooling systems (DHCS) is described. It is believed that the energy and cost savings possible through using district heating and cooling (DHC) will stimulate creation of local jobs, reduce dependence on fuel imports, and spur activities for redevelopment or revitalization. Twenty-eight communities have received cooperative agreements to aid in a national assessment of DHCS feasibility. Preliminary market analysis for proposed DHC service areas would provide basic information on customer characteristics and their potential and desires to connect with a district system. This report explains a few of the common low-cost methods for rough-cut, preliminary market analysis, including a detailed look at a questionnaire method. The report is written for three groups of people: (1) individuals in the 28 communities who will need to collect market research data, (2) laboratory technical support personnel assigned to help explain research techniques, and (3) the community personnel who will be using the results of the market analysis to help them assess the feasibility of DHC applications in their communities. (ERA citation 07:044078)

DE82011718 MF **A01**
Lewin and Associates, Inc., Washington, DC.
Market Analysis of Shale Oil CO-Products. Appendices.
Dec 80, 242p DOE/RA/34014-T1
Contract AC01-79RA34014
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Data are presented in these appendices on the marketing and economic potential for soda ash, alumina, and nahcolite as by-products of shale oil production. Appendices 1 and 2 contain data on the estimated capital and operating cost of an oil shales/mineral co-products recovery facility. Appendix 3 contains the marketing research data. (ERA citation 07:052771)

DE82012351 MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Market Assessment of Photovoltaic Power Systems for Agricultural Applications in Colombia.
W. Steigelmann, and S. Neyeloff. Nov 81, 124p
DOE/NASA/0180-5, NASA-CR-165524
Contract AI01-76ET20485
Best available copy from document source. Available in microfiche only.

An assessment is made of the market potential for photovoltaic systems in the agricultural sector of Colombia. Consideration was given to over twenty specific livestock production, crop production, and rural services applications requiring less than 15 KW of power without backup power. Analysis revealed that near-term potential exists for photovoltaic technology in applications in coffee depuiging, cattle watering, rural domestic users, rural water supply and small irrigation, rural telephones, rural health posts, and vaccine refrigeration. Market size would be in the 1200 to 2500 KWp range in the 1981-86 timeframe. Positive factors influencing the market size include a lack of electrical services, potential for developing the Llanos Orientales Territory, high fuel costs in remote areas, balance of system availability, the presence of wealthy land owners, and a large government-sponsored contract for PV-powered rural telephone systems. The anticipated eligibility of photovoltaic equipment for loans under the Fifth Law would be a further positive factor in market potential. Important negative factors include relatively inexpensive energy in developed locations, reliance on hydropower, lack of familarity with PV equipment, a lack of financing, and established foreign competition in PV technology. Recommendations to American PV manufacturers attempting to develop the Colombian market are to offer complete systems, perform as much production and assembly of systems as possible in Colombia or another Andean Pact country to avoid higher tariffs, and consider forming corporations with majority Colombian participation in light or trade advantages. (ERA citation 07:042878)

DE82013208 MF **A01**
Donovan, Hamester and Rattien, Inc., Washington, DC.
Analyze a Series of Policy Initiatives and Congressional Bills. Task XII.
30 Sep 79, 105p DOE/CS/20059-T12
Contract AC01-78CS20059
Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

An analysis is made of the policy initiatives of the Capital Cost Recovery Act (CCRA) and Job Security and Energy Conservation Act (JSEC). The results of the initiatives are compared. The impacts of CCRA and JSEC on investment attractiveness, major energy-using industries, site selection of facilities, and competitive funding are discussed. Macroeconomic and total energy impacts are considered. The potential for conservation, energy use, conservation constraints and opportunities, and the impacts of CCRA on the paper industry are discussed. Energy costs, investment patterns, regional distribution, technical opportunities for conservation, and legislative impacts (without enactment of either CCRA or JSEC) for petroleum refineries are examined. The potential for energy conservation, job security, and job creation are discussed for the chemical industry.

DE82013217 MF **A01**
Donovan, Hamester and Rattien, Inc., Washington, DC.

Credit Tools to Promote Energy Conservation: A Possible Federal Role.
1 Nov 79, 28p DOE/CS/20059-T21
Contract AC01-78CS20059
Portions of document are illegible.
Available in microfiche only.

An analysis is presented of the potential of banking institutions to assist in the promotion and implementation of energy conserving measures. Emphasis is given to urban problems and to a possible federal involvement with any measures taken. The relationship between commercial banks and their borrowers was examined. In order to assess a potential federal role, existing regulatory mechanisms were examined. Senior officers of commercial banks were interviewed. A review of relevant literature and federal regulations was undertaken. The fundamentals of lending decisions were reviewed and analyzed in order to develop an understanding of the function of energy considerations in the loan process. The large money-center bank, which satisfies the financial needs of the Fortune 500 borrowers and the city-wide or regional bank, which derives its business from local consumers, are considered.

DE82013218 MF **A01**
Donovan, Hamester and Rattien, Inc., Washington, DC.
Analysis of Options for a Solar Development Bank. Task VI.
30 Sep 79, 23p DOE/CS/20059-T6
Contract AC01-78CS20059
Portions of document are illegible.
Available in microfiche only.

Financial barriers which hinder the use and acceptance of solar technology in the building and industrial markets are identified. The barriers fall under three categories: risk, liquidity, and subsidy. Policy initiatives that can be used to overcome financing barriers which hinder the use of solar technology are briefly mentioned. These include direct lending programs operated by the government or by private banks and secondary financing organizations which provide liquidity and security to mortgage lenders. Policy options considered to accomplish the objectives of the initiatives and the evaluation of each option is presented. Options considered are: to modify existing governmental programs and institutions so that these institutions more effectively promote the use of solar energy; to create a new and separate institution to undertake a number of financing functions; and to create a direct federal loan program. The proposed functions of a Solar Development Bank are specifically examined. Information on functions and participants in the secondary mortgage market is discussed in the appendix. The text of a presidential speech on the technically feasible use of solar powered units is given.

DE82013220 MF **A01**
Donovan, Hamester and Rattien, Inc., Washington, DC.
Policy Issues in Promoting Urban Conservation. Task IV.
30 Sep 79, 8p DOE/CS/20059-T5
Contract AC01-78CS20059
Portions of document are illegible.
Available in microfiche only.

A brief overview is presented of the economic status of US cities. Opportunities for efficient use of the existing urban structure are described and results of a city's overall conservation and revitalization effort are briefly noted.

DE82013480 PC **A03**/MF **A01**
Boston Univ., MA.
Petroleum Emergency Preparedness Study. Report on the Macroeconomic Consequences of a Medium-Sized Oil-Supply Disruption with a Market-Based Policy Response and Tax Rebates.
D. S. McClain. 9 Feb 81, 28p DOE/PE/70333-T1
Contract AI01-81PE70333

This report discusses the 3-year impact on the US economy of a temporary, medium-sized disruption in world oil supplies beginning on January 1, 1982. Results of the analysis suggest that significant adverse effects can be expected in the short term on real GNP, unemployment, and inflation. A discussion on policy implications and tax rebates is presented. The Data Resource model of the US economy was used to predict economic impacts.

DE82015517 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
Methodology for Adjusting Disaggregate Input-Output Models to More Aggregate Models.
P. J. Groncki. Dec 81, 93p BNL-51393
Contract AC02-76CH00016

The need for an analytical basis for policy formulating and evaluation has spawned several modeling systems for assessing the impacts of alternative policies. The detailed information concerning the technological structure of the industries included in input-output models makes them ideal for this type of modeling framework. However, the assumption of fixed technological coefficients limits the usefulness of these models in that it ignores the flexibility and responsiveness of the economy. This paper presents a methodology for capturing the general equilibrium nature of allocative change in the economy in a disaggregate input-ouput model given the existence of aggregate, flexible-coefficient, general equilibrium input-output models. That is, given the existence of historical input-output data, and an aggregate flows in the economy for a specific future year, given a set of exogenous specifications for the aggregate model. The methodology utilizes an iterative-linear programming framework for adjusting a recent, known disaggregate input-output table given the aggregate information for a future year. Several weighting schemes for the objective function are examined and the implicit assumptions which they embody concerning the nature of technological change are discussed. Results of the testing of this methodology on historical input-output tables are presented. (ERA citation 07:047235)

DE82902419 MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Energy Use of the Industrial Sector in Relation to the Economic Characteristics of 1977.
F. G. H. Van Wees. May 81, 33p ESC-7
In Dutch.Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

In preparation for a study on the industrial energy consumption in the Netherlands, information concerning the use of some energy carriers in 1977 for 65 industrial sectors are supplemented with an economic description. The result is a weighted classification of industrial sectors, which serves as a basis for further study. (ERA citation 07:043892)

PB82-928110 PC **E03**/MF **A01**
Central Intelligence Agency, Washington, DC.
Soviet Statistics on Capital Formation.
Aug 82, 32p SOV-82-10093
Errata sheet inserted.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-928100.

This report presents a compilation of statistics on fixed capital assets and capital investment in the Soviet Union. Included are estimates of the value of fixed capital (a stock concept) as well as estimates of fixed capital investment (a flow concept)--both series by sector of the economy and by branch of industry.

PB83-109983 PC **A06**/MF **A01**
Hudson Inst., Croton-on-Hudson, NY.
Capital Markets Serving Small Business: Implications of the Rapid Evolution of the Financial Services Industry.
Final rept.,
Irving Leveson. Aug 82, 102p HI-3492-RR
Grant SB-2A-00064-01-0

This study examines the impact of bank size on performance. Two aspects of bank performance are evaluated: (1) the effect of the business cycle, especially during periods of tight money on small versus large banks, and (2) the long-run impact of NOW accounts on the financial condition of banks. The study presents the material from a historical perspective and since the enactment of the Depository Institutions Deregulation and Monetary Control Act of 1980. The methodology includes multivariate statistical modeling using FDIC and Federal Reserve Board microdata tapes.

PB83-111419 PC **A10**/MF **A01**
Society for Glass Science and Practices, Inc., Clarksburg, WV.
Society for Glass Science and Practices, Inc. Final Report on the United States Hand Glass Industry.
Final rept.
Aug 82, 220p 83-26-001
Grant ITA-99-26-07106-30
Prepared in cooperation with Trundle Consultants, Inc., Cleveland, OH.

Increases of foreign handmade glass shipments into the U.S. in recent years have significantly altered competitive equilibriums. This led to widespread concern about the U.S. hand glass industry's future. This report identifies a range of opportunities for new technology, manufacturing methods, and marketing directions. Each company in the industry can select from these opportunities the type action most appropriate for its objectives and resources.

PB83-112250 PC **A02**/MF **A01**
International Customs Tariffs Bureau, Brussels (Belgium).
Czechoslovakia: International Customs Journal. 5th Edition, Supplement 1, Year 1982-1983.
Bulletin,
Jul 82, 20p BULL-189-SUPPL-1-5
See also 5th Edition, PB81-161499.

The report is an annex to International Customs Journal no. 189 (5th edition), giving details of the preferential tariff treatment granted to the least developed among developing countries and to the developing countries by the Czechoslovak Socialist Republic.

PB83-113597 PC **A09**/MF **A01**
Chicago Economic Research Associates, Inc., Evanston, IL.
Federal Regulation of Small Business.
Final rept.,
William A. Brock, and David S. Evans. 30 Aug 82, 187p
Grant SB-1A-01-0

A model of business formation and dissolution to analyze the effects of Federal tax and regulatory policies on small business is presented. The model will estimate, for small business in several industries, the dynamic welfare gain from certain alternative government policies.

PB83-113712 PC **A18**/MF **A01**
Indian Inst. of Tech., New Delhi.
A Policy Study of Small Scale Industries and Government Policies with Special Reference to Chemical Industry.
Doctoral thesis,
Lata Singh. 1980, 405p

Industrialization has been considered to be a critical component in the process of modernization, and emphasis has been laid in the developing countries on rapid industrialization. In the industrialization policy formulation of a vast agrarian economy like India, small scale industries have been assigned an important place to spread the benefits of industrialization throughout the country. There have been statements praising the achievements, and similarly statements have been made pointing to their shortcomings. However, an analytical policy study of the subject does not appear to have been carried out. The present study relates to the examination of small industries with special concern about policy and institutional issues focussing attention on the chemical industry.

PB83-851642 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Portfolio Models and Theories. April, 1973-October, 1982 (Citations from the Management Contents Data Base).
Rept. for Apr 73-Oct 82.
Oct 82, 81p
Supersedes PB81-852113.

This bibliography contains citations concerning portfolio management, including portfolio mixture strategies and theories for portfolio management. Criteria and techniques for appraising individual and portfolio investments are included. (This updated bibliography contains 103 citations, 25 of which are new entries to the previous edition.)

5D. History, Law, and Political Science

AD-A119 622/9 MF **A01**
American Univ., Washington, DC. Foreign Area Studies.
Nigeria: A Country Study.
Area handbook series,
Harold D. Nelson. May 81, 378p DA-PAM-550-157
Supersedes AD-738 721.
Availability: Superintendent of Documents, GPO, Washington, DC 20402 HC $12.00 Microfiche furnished to DTIC (and NTIS) users.

When research for the Area Handbook for Nigeria was completed in mid-1971, the country was struggling with problems that had arisen in an era of sociopolitical crisis-difficulties that had strained traditional regional relationships and national unity. A series of coups d'etat had brought an end to the civilian government of the first republic in 1966, and thirty months of bloody civil war had just been concluded. In 1979 a return to civilian rule ended nearly fourteen years of military government. Consequently, a new edition evaluating the impact of these changes on the country's societal institutions is appropriate. Nigeria: A Country Study, like its 1971 predecessor, is based on a wide sampling of the many published sources of information about a West African state of growing importance. This book attempts to provide in compact, convenient, and balanced form an exposition and analysis of the dominant social, economic, and political features of Nigerian society. It is designed to give readers an understanding of the major forces at work within the culture as well as an insight into the goals and values of the people. Sources of information used in the study's preparation include scholarly works, official reports of governmental and international organizations, journals, and newspapers.

AD-A119 650/0 PC **A04**/MF **A01**
Joint Chiefs of Staff, Washington, DC. Special Operations Div.
Soviet News and Propaganda Analysis Based on RED STAR (The Official Newspaper of the Soviet Defense Establishment) for the Period 1-31 July 1982. Volume 2, Number 7, 1982.
1982, 55p
See also Volume 2, Number 6, AD-A118 817.

The data in this report reflects Soviet print media emphasis and propaganda trends for over three years – June 1979 through July 1982. During this period, almost 41,800 feature stories and news items were analyzed. However, the main purpose of this edition is to provide the reader with an overview of Soviet rhetoric, propaganda themes and topics directed to Russian military forces during July 1982. This report contains a summary of propaganda themes from the Russian language newspaper Red Star. With a circulation of several hundred thousand copies, this 'daily' newspaper is the official publication of the Soviet defense establishment. In particular, it represents the views and articulates the issues important to the Main Political Administration of the Soviet Army and Navy, which is responsible for the political reliability of all Soviet military forces. The Main Political Administration receives its guidance directly from the Central Committee of the CPSU.

AD-A119 693/0 PC **A04**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
United States and Western European Terrorist Groups - Current Status and Future Perspective.
Study project,
Thomas E. Burns, Jr. 7 Jun 82, 69p

This study reviews selected recent and historical terrorist activity in the US and Western Europe. It discusses the current status of terrorist groups in the US, Ireland, Germany and Italy. Definitions of terrorism from authorities in the academic, political and intelligence arena are set forth. Philosphical difficulties with the concept of terrorism are discussed, including the moral dilemma terrorism episodes present to the world community. Terrorism's weaknesses are illustrated both philosophically and practically. Contemporary US terrorism is viewed in the context of a recurring social phenomenon the most recent incarnation dating approximately from the mid-sixties. Statistical accounting of claimed US terrorists incidents from January 1980 to December 1981, is set forth revealing a total of 71 incidents by various groups including Armenian, Jewish, Cuban Croation, Puerto Rican and others. Actions concerned with Puerto Rican terrorism are shown to account for more than 40% of all incidents during the two year period as well as the most significant damages and injuries. Wester European terrorism overview presented with specific details relating views of government officials on aspects of foreign direction, revealing general consensus of no direct evidence of Soviet or foreign control of plans and/or operations. Connection between various national terrorist groups acknowledged but no unified orchestration perceived on the part of many. Terrorism is compared with other social phenomena to place terrorism in its proper context for threat assessment.

AD-A119 718/5 PC **A03**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
Contemporary Terrorism.
Student essay,
Malcolm A. Danner. 19 Apr 82, 45p

Col Danner's paper centered on the subject of political violence as it relates to current events in world affairs. He traces the trends and transitions in this subject; which he terms contemporary terrorism. He compares the vulnerabilities of various types of governments to terrorist acts and makes a series of subjections on how the United States might organize to better combat the threat of political violence. The tone of this paper is a mixture of good research and the strong feelings of a U.S. Army Infantry Officer on this subject. (Author)

PB82-928112 PC **E11**/MF **A01**
Central Intelligence Agency, Washington, DC.
Directory of Soviet Officials: National Organizations.
Aug 82, 349p CR-82-14044
Supersedes PB81-928108.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-928100.

The report is a Reference Aid for identifying leading officials in the Soviet Government and Communist Party of the Soviet Union.

PB83-113159 PC **A04**/MF **A01**
Technische Hogeschool, Delft (Netherlands).
Globaal Overzicht van de Belangrijkste Wetten en Internationale Overeenkomsten op het Gebied van de Veiligheid en van de Bescherming van het Milieu (Global Survey of the Most Important Legislations and International Agreements in the Area of Safety and the Protection of the Environment).
Annual rept. (Final),
Ben Quist. Jul 81, 53p
Text in Dutch.

The report itself does not make any claims for completeness. Its purpose is to present annual revisions and in so doing provide further information on legislations and international agreements affecting the various systems of transportation, labor systems, products safety, the protection of the environment and disaster prevention.

5E. Human Factors Engineering

AD-A119 763/1 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
A Cornell University Large Classroom Utilization Study.
Master's thesis,
David Michael Armitage, Johnny Tak-yuen Fung, and Linda Louise Pangborn. May 82, 65p Rept no. AFIT/CI/NR/82-56T

This project seeks to determine if there is a shortage of large classrooms and lecture halls at Cornell. A large classroom, for the purposes of this project, is one with a capacity of 68 or more. A total of 75 rooms at Cornell fit this size description. Two quantitative measures, the utilization rate and the occupancy rate, provide a basis for the analysis performed in arriving at the results. The utilization rate is the percentage of time a classroom is used. The occupancy rate is the average percentage of seats occupied when a classroom is used. The rates are determined for all 75 rooms using Fall 1981 data. The data consists of sections, days, times and class enrollments for these larger classrooms. Final results of the analysis indicate there is no physical shortage of large classrooms and lecture halls at Cornell. In fact, the average utilization rate of all rooms is approximately 56%, and the average occupancy rate is only 45%.

N82-31950/0 PC **A02**/MF **A01**
Sheffield Univ. (England). Dept. of Control Engineering.
The Bench Mining System: Progress in Two-Dimensional Simulation of Steering Characteristics.
J. B. Edwards. Mar 82, 19p RR-176

Computer programs which simulate the vertical steering characteristics of the thick seam bench mining system were adjusted, in order to eliminate unwanted penetration of the floor. A flow chart which describes program functions needed to obtain bench fit is presented. Results for a variety of floor profiles confirm the validity of the fitting routines, so these routines were incorporated into color graphics simulation programs. Effects of interaction between roof support and bench can be incorporated into the simulation routine. Roof support and roof beam fitting routines work well for chocks with a very short front extension, but less well for long based chocks.

5F. Humanities

PB83-112334 PC **A04**/MF **A01**
MESA Corp., Orem, UT.
Cultural Resources Survey of Portions of the Upaico Unit, Utah.
Final rept.,
V. Garth Norman, David Merrill, and Don D. Southworth. 15 Feb 82, 61p MESA/CRM/PAPER-6
Contract DI-1-07-40-S1728

MESA Corporation conducted a Class III intensive survey of cultural resources of portions of the Upaico Unit of the Central Utah Project. The areas surveyed will be affected by construction of Taskeech Dam, the Taskeech Feeder Canal, the Boneta Diversion Dam, and the Taskeech Service Canal. Survey work was conducted in two stages for this project: August 3-5, 1981 on non-Indian land, and August 24-28 on land within the Uintah and Ouray Indian Reservation. One prehistoric and four historic sites were identified. Of the four historic sites, one was judged ineligible and three eligible for the National Register of Historic Places.

PB83-113308 PC **A04**/MF **A01**
MESA Corp., Orem, UT.
Cultural Resources Survey of the Fifth Water Alternative, Diamond Fork Power System, Utah.
Final rept.,
David B. Merrill, and Asa S. Neilson. 28 Aug 81, 51p MESA/CRM/PAPER-3
Contract DI-1-07-40-S1728

MESA Corporation conducted a Class III cultural resources survey of 900 acres in the pool areas of the proposed Monks Hollow and Fifth Water Reservoirs, and a 200 foot by 8 mile corridor for the Diamond Fork Pipeline, Diamond Fork Power System, Bonneville Unit Central Utah Project. Survey work was conducted May 5 - 15, 1981, on Forest Service and private land. During the survey, four prehistoric sites and 19 historic sites were recorded. One prehistoric and nine historic sites are considered eligible for inclusion in the National Register of Historic Places.

5G. Linguistics

AD-A119 741/7 PC **A04**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
On Interpreting Semantic Network Formalisms.
Technical rept.,
David J. Israel. Sep 82, 56p Rept no. BBN-5117
Contract N00014-77-C-0371

In a recent paper, Reiter and Criscuolo remark 'that (semantic) networks are notational variants of logical

formulae is by now a truism in Artificial Intelligence circles'. Shamelessly exploiting the foregoing quote as a pretext, I attempt to sketch adequate semantic accounts for at least two (kinds of) semantic network formalisms: one, based on the notion of inheritance; one, not. A crucial condition of adequacy to be satisfied is fidelity to some of the intuitions of the creators of the formalisms. (Author)

5H. Man-Machine Relations

AD-A119 767/2 PC **A07/MF A01**
Naval Air Development Center, Warminster, PA. Aircraft and Crew Systems Technology Directorate.
Vocal and Manual Response Modes: Comparison Using a Time-Sharing Paradigm.
Final rept.,
Christian P. Skriver. Jan 79, 134p Rept no. NADC-79127-60

In the increasingly complex area of man-machine interface, the human operator is often required to perform two or more tasks which demand full attention simultaneously, oftentimes overloading the operator's manual and visual capabilities. The recent commercial availability of voice recognition devices has opened up the possibility that a voice-actuated response could act as an extra pair of hands for the operator. Proponents of voice recognition devices have hypothesized that vocal response would be independent of other channels; would interfere less with other activities and would be faster than manual response mode. The present study was designed to test the effectiveness of a voice response as compared with a manual response in a time-sharing environment. (Author)

N82-31951/8 PC **A03/MF A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Reading Text from Visual Display Units.
Y. Waern, and C. Rollenhagen. May 82, 38p FOA-C-53006-H2

Psychological aspects of reading are reviewed, and problems faced by good readers who are unfamiliar with computers, but who have to work with visual display units (VDU) are discussed. Text processing theories and psychological investigation methodologies for factors affecting VDU operator performance are examined.

5I. Personnel Selection, Training, and Evaluation

AD-A119 409/1 MF **A01**
Army Russian Inst., APO New York 09053.
Soviet Dissident Scientists, 1966-78: A Study.
Student research rept.,
Marshall L. Brown, Jr. Jun 79, 175p
Availability: Microfiche copies only.

This study is an analysis of the Soviet dissident scientists of the 1960's and 1970's - who they are, what they have protested, and why they have protested. Over 550 names of scientists involved in dissident activities have been culled rom unofficial samizdat material available in the West and relevant biographical information on these scientists had been arranged in tabular form. On the basis of correlations found in this data conclusions have been reached on what has caused the scientists to turn to dissident acitvity. This study also includes a chronology of dissidence in the Soviet scientific community in the period 1966-78, an analysis of the groups within the dissident movement with which the dissident scientists have aligned themselves, and some predictions on the prospects of future dissidence among scientists. (Author)

AD-A119 413/3 PC **A03/MF A01**
Oregon Univ., Eugene. Graduate School of Mangement.
Facilitating Effective Performance Appraisals: The Role of Employee Commitment and Organizational Climate.
Technical rept.,
Richard M. Steers, and Thomas W. Lee. Aug 82, 26p Rept no. TR-10-ONR
Contract N00014-81-K-0026

Previous research on performance appraisals has primarily concerned the reliability and validity of measurement instruments and techniques. Very little research has dealt with the milieu where the actual performance appraisal occurs. In order to help remedy this situation, a conceptual model is presented which highlights the interactive relationships among employee commitment, organizational climate, and performance appraisal systems. The model addresses four key issues: what are the organization's objectives in the appraisal system; what conditions facilitate or inhibit the accomplishment of these objectives; how do employee commitment and organizational climate affect these conditions; and what reciprocal relationships appear likely. (Author)

AD-A119 416/6 PC **A03/MF A01**
Oregon Univ., Eugene. Graduate School of Mangement.
The Psychology of the Withdrawal Process: A Cross-Validational Test of Mobley's Intermediate Linkages Model of Turnover in Two Samples.
Technical rept.,
Richard T. Mowday, Christine S. Koberg, and Angeline W. McArthur. Aug 82, 28p Rept no. TR-11-ONR
Contract N00014-81-K-0026

This study investigated the validity of Mobley's (1977) model of the intermediate linkages in the turnover decision process among employees working in two diverse setting. A pattern of results generally consistent with the model was found in each sample. However, regression analyses generally failed to double cross-validate either within or between samples. This was true both when the contribution of variables to the prediction of turnover was analyzed individually and when variables were grouped into more homogeneous sets of predictors. Employee commitment to the organization was the only variable that double, cross-validated, both within and between samples, in the prediction of turnover. (Author)

AD-A119 435/6 PC **A04/MF A01**
Washington Headquarters Services (DOD), DC. Directorate for Information Operations and Reports.
Department of Defense Military Manpower Statistics.
Jun 82, 60p
See also AD-A118 786.

The Military Manpower Statistics (MMS) report presents aut ed statistical data pertaining to military personnel on active duty and personnel in military reserve components, for the current fiscal year on a monthly basis. The March, June, September, and December issues contain quarterly summaries of certain military manpower data as annotated in the Table of Contents. Although these tables are revised quarterly, they are published without changes in two subsequent monthly editions of this publication. The publication is generated from a computerized data base developed and maintained by the Manpower Management Information Division of WHS/DIOR.

AD-A119 459/6 PC **A03/MF A01**
Navy Personnel Research and Development Center, San Diego, CA.
Tailoring Shipboard Training to Fleet Performance Needs: IV. Training Modules and Administrative Aids for the Shipboard Propulsion Plant Operator Training (SPPOT) Program.
Interim rept. Jul 79-Sep 80,
Ray E. Main, Macy L. Abrams, Charles R. Chiles, and Jack L. Todd. Aug 82, 49p Rept no. NPRDC-TR-82-61
See also Rept. nos. NPRDC-TR-82-6, AD-A107 936, NPRDC-TR-81-23, AD-A105 677 and NPRDC-TR-78-30, AD-A059 292.

Prototypes of performance-oriented instructional modules and administrative aids were developed for use in training main propulsion watchstanders in shipboard environments. These materials, along with previously developed procedural trainings aids, constitute the Shipboard Propulsion Plant Operator Training (SPPOT) program. The modules provide relevant background on propulsion fundamentals and the functional characteristics of propulsion systems. Materials are ship-specific and designed for use in work environments. The administrative aids related SPPOT materials to the Navy's Personnel Qualification Standards (PQS) system. (Author)

AD-A119 474/5 PC **A03/MF A01**
RAND Corp., Santa Monica, CA.
A Preliminary Survey of Risk and Safety Operations at Selected Universities.
Steven L. Salem, and Kenneth A. Solomon. Apr 82, 26p Rept no. Rand/P-6762

No abstract available.

AD-A119 486/9 PC **A02/MF A01**
School of Aerospace Medicine, Brooks AFB, TX.
Physical Standards for High-Performance Fighter Aircraft Pilots.
James R. Hickman, John H. Triebwasser, and Malcolm C. Lancaster. 1980, 6p Rept no. SAM-TR-80-357
Pub. in Aviation, Space, and Environmental Medicine, v51 n9 p1052-1056 Sep 80.

No abstract available.

AD-A119 519/7 PC **A03/MF A01**
Illinois Univ. at Urbana-Champaign. Human Attention Research Lab.
Automatic Category Search and Its Transfer: Automatic Process Semantic Filtering.
Technical rept.,
Walter Schneider, and Arthur D. Fisk. Jul 82, 27p Rept no. HARL-ONR-8202
Contract N00014-81-K-0034

When subjects receive extended practice searching for words from a consistently mapped (CM) category, search becomes substantially faster, more accurate, and less effortful. The present experiments examine the extent to which category search practice effects are semantically based. Experiment 1a examined improvements in reaction time in detecting words from a category as a function of the number of exemplars (4-12) in the category. All conditions showed improvement, but there was no effect of the number of exemplars. Experiment 1b examined the extent to which training on a subset of exemplars transferred to untrained members of the category. Results showed substantial positive transfer (60 to 92%) to untrained exemplars from the trained category and the transfer was better if there were more exemplars in the training set. Experiment 2a replicated previous results showing that practice reduces resource sensitivity in consistently mapped (CM) category search but does not benefit variably mapped (VM) category search. Experiment 2b examined whether untrained exemplars of a CM trained category would be detected on first presentation when subjects were engaged in a high workload VM digit search task. Untrained exemplars of the CM category were detected on first presentation showing substantial positive transfer (70%).

AD-A119 552/8 PC **A03/MF A01**
Texas Univ. at Austin. Center for Cybernetic Studies.
A Sea-Shore Rotation Goal Programming Model for Navy Use.
Research rept.,
A. Charnes, W. W. Cooper, D. Divine, W. Hinkel, and J. Koning. Jul 82, 29p Rept no. CCS-RR-429
Contracts N00014-81-C-0236, N00014-80-C-0131

Relations between sea duty and shore duty in the U.S. Navy involves large numbers of variables and constraints, along with projected rates of attrition, promotion, demotion, and transfer, which need to be simultaneously considered over a series of periods. Mechanisms for evaluating possible changes in policies and other requirements are also required. This paper reports on a constrained network goal programming model with an accompanying algorithm and a computer code (called BIGNET) which makes it possible to deal with all of these aspects of the Navy's sea-shore rotation problems in the ultra high speed processing times that are characteristic of network codes. An accompanying appendix contains a numerical example with accompanying details of the way the model can be implemented.

AD-A119 570/0 PC **A04/MF A01**
Naval Postgraduate School, Monterey, CA.

Evaluation of Helicopter Pilot's Attitude Control Using a Simulated Head-Up Display in a Simulated Helicopter Cockpit.
Master's thesis,
Michael C. Stichter. Jun 82, 58p

As demands on the aviator's aeronautical, technical, and tactical skills increase, so must the employment of advanced cockpit design concepts. Advanced systems make for a reduced crew workload and a safer, more proficient mission capable aircraft. Six designated helicopter pilots (Navy, Marine Corps and Army) were evaluated on their ability to fly a simulated instrument flight regime using only a head-up display as an attitude reference. Flight and control simulation was obtained through the construction of a generic helicopter cockpit, with dynamic gage indications generated by an analog computer. Two head-up display flights were flown with the display in the 12 o'clock and 2 o'clock positions. Their results were compared to an initial flight using cockpit instrumentation only. All three flights were identical profiles. Pilot performance was recorded graphically with strip charts and reduced into three performance zones. By averaging the percentage of time each pilot was in zone one, over each individual flight, it was shown that the average pilot's performance using the head-up display was within four to seven percentage points of their performance using only cockpit instrumentation. (Author)

AD-A119 574/2 PC **A10/MF A01**
Naval Postgraduate School, Monterey, CA.
A Methodology for the Evaluation of Unit Tactical Proficiency at the National Training Center.
Master's thesis,
John Scott Furman, and Richard Lynn Wampler. Mar 82, 212p

The evaluation process currently planned for the National Training Center at Fort Irwin, California, is examined and a methodology proposed for evaluating unit tactical proficiency from the data accumulated. The concept of a Training Readiness Profile (TRP) is suggested as a concise method for assisting the Battalion Commander and his subordinates in meeting the training objectives of FM 71-I, FM 71-2, and ARTEP 71-2. This concept is applicable to Armored and Infantry battalions and to their training programs as currently specified under Department of the Army Doctrine. This methodology is compatible with the automated information retrieval systems currently being specified for installation at the National Training Center. (Author)

AD-A119 577/5 MF **A01**
Army Training Developments Inst., Fort Monroe, VA.
Proceedings of the TRADOC/Training Developments Institute, 7th Chiefs of Analysis Seminar, 22-26 March 1982.
Final rept.
1 Sep 82, 225p
Availability: Microfiche copies only.

The proceedings represent the presentations made at the 7th TRADOC/TDI Chiefs of Analysis Seminar held at the Bonhomme Richard Inn, Williamsburg, VA, 22-26 March 1982. The primary theme of this seminar was 'Identifying and Resolving the Problems of Analysis.' The intent of this seminar was to provide a forum to address training analysis issues, to consider the current state-of-the art activities within front end analysis/performance technologies, to resolve problems within the TRADOC community attendant to each, and to allow service school Chiefs of Analysis to interact with the ORAD staff (the TRADOC proponent for front end analysis policy and training). (Author)

AD-A119 611/2 PC **A05/MF A01**
Navy Personnel Research and Development Center, San Diego, CA.
The Intentions of Men 23 to 29 Years Old to Join the Military: Results of a National Survey.
Final rept. Apr 80-Apr 82,
Jules I. Borack. Sep 82, 78p Rept no. NPRDC-TR-82-62

The population of 23-29 year olds will increase during the early 1980s and remain above 1980 levels throughout the decade. The population of the prime enlistment pool, 17-21 year old males, will decrease sharply during the 1980s and beyond. Due to the demographic shift, increased consideration may be given toward augmenting this traditional supply source by recruiting somewhat older individuals. Therefore, a survey was conducted to assess the interest of 23-29 year old men in joining the military under present conditions and under monetary (bonuses, educational incentives, lateral entry pay) and nonmonetary (training, job, location guarantees, contract length options) incentives. Findings are presented detailing interest levels under current conditions and under each incentive. The composition of the pool of interested men, uninterested men, and those interested only under incentive options is assessed in terms of its demographic components. (Author)

AD-A119 620/3 PC **A03/MF A01**
Naval Biodynamics Lab., New Orleans, LA.
Translation of Functional Tasks of a Naval Workstation to Structured Job Elements.
Research rept.,
Richard H. Shannon. Mar 82, 34p Rept no. NBDL-82R007

Two task inventories, Combat Information Control Officer (CICO) in the E2 aircraft and the Operations Specialist Rating (OS) containing respectively 249 and 325 tasks, were translated into structured job elements of the Position Analysis Questionnaire (PAQ). Both of these rating profiles represented functions performed in Naval Combat Information Centers by 35 (CICO) and 1909 (OS) people. The adequacy of the translation was determined through a correlational comparison with other PAQ profiles from similar jobs. Seven sets of Radarman Rating (RD) scores were provided by PAQ Services from their computer files. The average correlation between CICO/RD and OS/RD were, respectively, .477 and .546, which compared rather well with the average correlation of .528 among the seven RD scores. When these ratings were pooled, the reliability coefficient using the Spearman-Brown formula was .913. The attribute requirements of these ratings were then isolated and these indicated that cognitive skills, visual perception/interpretation, and quantitative skills were critical to performance within the tactical command and control workstation. (Author)

AD-A119 629/4 PC **A02/MF A01**
Military Academy, West Point, NY. Office of the Director of Institutional Research.
Characteristics of the Class of 1986,
John W. Houston. Aug 82, 18p Rept no. USMA-OIR-82-012
See also AD-A107 100.

This report presents the biographical characteristics and achievements of the 1,420, new cadets who entered the United States Military Academy in the Class of 1986. (Author)

AD-A119 648/4 PC **A07/MF A01**
RAND Corp., Santa Monica, CA.
The Design, Administration, and Evaluation of the 1978 Selected Reserve Reenlistment Bonus Test.
Interim rept.,
David W. Grissmer, Zahava D. Doering, and Jane Sachar. Jul 82, 150p Rept no. RAND/R-2865-MRAL
Contract MDA903-80-C-0652
See also AD-A115 774.

This report describes the results of a national experiment designed to study factors that influence reenlistment decisions of Army Reserve and National Guard personnel. Some 15,300 reservists making reenlistment decisions in 1978 participated in the experiment. The effect of bonuses given for 3-year terms ($900) or 6-year terms ($1800) on reenlistment rates and length of commitment was estimated by comparing the responses of the group offered the bonus with those of a matching control group. While the bonus raised reenlistment rates only from 38.4 to 40.6 percent, it lengthened the average committed term of service from 1.3 to 4.4 years. Longitudinal tracking of test participants indicates that a significant strength gain will result from the longer term of service commitment. Two years after the test began, 37.3 percent of the original bonus group remained in service, while only 30.4 percent of the control group remained.

AD-A119 649/2 PC **A16/MF A01**
Memphis State Univ., TN.
Navy Verbal Skills Curriculum Guide. Supplement.
Final rept.,
Harry L. Bowman, Paul L. Jones, Robert A. Kaiser, and Janet Thompson. Jul 82, 363p TAEG-TR-128-SUPPL
Contract N00612-79-R-0477
Supplement to Rept. no. TAEG-TR-128.

This report is concerned with the development of a Navy-relevant Verbal Skills Curriculum for use in the Navy Recruit Training Commands (RTCs). The project was undertaken by the Training Analysis and Evaluation Group as one of several initiatives in response to tasking by the Chief of Naval Education and Training in the area of improvement of basic skills. This curriculum is designed to improve the language fluency skills of Navy recruits, particularly those who speak English as a second language. The results of a field test of the curriculum by personnel of the Orlando RTC Academic Remedial Training (ART) division were positive, indicating that it is a useful tool and that students are interested in, and motivated by, Navy-related materials. This curriculum has been approved and implemented in ART divisions at the RTCs. (Author)

AD-A119 680/7 PC **A14/MF A01**
Vector Research, Inc., Ann Arbor, MI.
Exploratory Research on Personnel Long Range Planning.
Technical rept. 1 Jan-15 May 82,
Seth Bonder, Timothy Doyle, George Miller, and Joyce Shields. May 82, 312p VRI-ARI-7.1-QRR82-1, ARI-RN-82-23
Contract MDA903-81-C-0579

The objective of this exploratory quick-response research project was to identify personnel-related research, data needs, and method developments required to support long range planning in the personnel area. This objective was accomplished by performing three main tasks: A conceptual analysis of personnel planning was performed to determine the kinds of information that should be included in a personnel long range plan (PLRP); A demonstration personnel long range planning exercise was conducted to determine if the information specified in task (1) could be generated and had utility; and The demonstration planning exercise was evaluated to identify research needs, data deficiencies, and method developments required to support effective personnel planning. Output of the project included research needs to support personnel long range planning, a pilot personnel long range planning system, and a demonstration personnel long range plan. (Author)

AD-A119 695/5 PC **A07/MF A01**
Army War Coll., Carlisle Barracks, PA.
Junior NCO Leadership.
Study project,
Richard R. Sklar, II . 1 Jun 82, 129p

Over 85% of commanders, Army-wide, on the last HQDA opinion survey indicated that junior NCO leadership was their biggest detriment to combat readiness. This paper attempts to determine the leadership deficiencies that junior NCO's possess and what actions can be taken to dissolve them. Over 600 infantry soldiers and NCO's in the 8th Infantry Division (M) were surveyed and interviewed. An analysis of their comments reveals that junior NCO's are weak in field skills that are tactically oriented and weak in their ability to train their subordinates. They are also weak in those leadership skills which require interaction with subordinates and which have potential for enhancing motivation and cohesion, Junior NCO's, on the other hand, perceive lack of support from above. A 36% shortage exists for NCO's at the squad level, turbulence is a way of life, and many subordinate are difficult to motivate. Solutions to the leadership problem include refocusing NCOES on MOS unique skills, especially when the Bradley is fielded. Intensive strength management is needed as is reduction of turbulence. Commanders must stress support and development of junior NCO's and of all levels of NCOES must include interactive leadership modules. Finally, consideration should be given to creating two MOS' in the Bradley to prevent the squad leader from being overloaded.

AD-A119 717/7 PC **A05/MF A01**
Navy Personnel Research and Development Center, San Diego, CA.
The Enlisted Survival Tracking File (STF): A Revision.
Final rept.,
Kenneth W. Gay, and Jules I. Borack. Sep 82, 98p Rept no. NPRDC-TN-82-27
Supersedes Rept. no. NPRDC-TN-81-11, AD-A116 426.

This report supersedes NPRDC Technical Note 81-11 of April 1981. It provides an update of the Enlisted Survival Tracking File (STF), a data base that permits analysis of the longitudinal behavior of individuals or

groups of individuals. STF has been used to forecast personnel losses. (Author)

AD-A119 744/1 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
Problems in Implementing the Army's CAPSTONE Program to Provide All Reserve Components with a Wartime Mission.
22 Sep 82, 12p Rept no. GAO/FPCD-82-59
Report to the Secretary of the Army.

At the outset, CAPSTONE concentrated on the North Atlantic Treaty Organization-Warsaw Pact scenario and was later expanded to cover the Rapid Deployment Force Army and Korean scenarios. War plans and standing operating procedures are to be developed initially by the gaining-commands and provided to appropriate, aligned Reserve units so that such units can develop complementary war plans and related training requirements. Although the Army has taken steps recently to improve CAPSTONE management, the present management system does not provide the authorities in Europe and the Continental United States with the information needed to properly manage the program and to determine whether implementation is progressing satisfactorily. The present system has obscured the fact that many units had not been contacted by their gaining-commands, and some units had not received the required training and planning guidance. Improving the management system so that implementation progress can be properly monitored and corrective actions can be promptly taken as problems arise is essential to assure that training is properly focused. Otherwise, Reserve component units may be wasting valuable training time. (Author)

AD-A119 754/0 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Productivity Improvement for Engineers.
Master's thesis.
Ronald Joe Calloway. Aug 81, 70p Rept no. AFIT/CI/NR-81-38T

The purpose of this paper is to develop a methodical approach to understanding and improving the productivity of an engineering workforce within an organization. Engineering workforce is, for the purpose of this paper, defined as those individuals that use engineering skills to conceive, design, and/or implement products, systems, or processes in other than research and development environments. Measurement of productivity, although very much related, is taken to be a separate issue and will not be addressed. (Author)

AD-A119 778/9 PC **A10**/MF **A01**
Development Research Associates, Arlington, VA.
Naval Personnel Organization; A Cultural-Historical Approach.
Final rept.,
James F. Downs, Judith Cohart, and Constance Ojile. Aug 82, 204p
Contract N00014-80-C-0198

This is a longitudinal study of changes in the Navy's official and unofficial personnel policies during the twentieth century. Data were gathered along a number of dimensions at 10-year intervals from 1900 to 1980. The emergence of new enlisted ratings is documented, along with changes in the non-judicial punishment system. Conclusions are drawn as to the reasons for the development of a training system; changes in recruitment strategies and manning; and variations in the handling of discipline. Changes in one area of the Navy 'matrix' are seen as having effects on many other parts of the system. Key dimensions studied are: organization structure, good order and discipline, recruitment, training, advancement, rewards and recognition, retirement, assignment and rotation, leave and liberty, uniform regulations, and authority. The study brings into question a number of assumptions about the past, including the effectiveness of the 'Old Navy' discipline, the status and role of the warrant officer, and the cultural patterns related to uniform and grooming regulations. (Author)

DE82010882 MF **A01**
Development of Human Resources in Metallurgy: Assessment of a Latin-American Experience.
J. Sabato. Nov 81, 15p UCRL-Trans-11761
Contract W-7405-ENG-48
A , Interciencia, 6 n6 P412-415 Nov 1981.Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This paper is an evaluation of 25 years of activity in Argentina directed toward the training of Latin-American personnel in work in metallurgy. During that period, 598 professionals have been trained. They have gone on to become means of spreading knowledge of metallurgy in their own countries and in the rest of the region, particularly in the institutions they have helped to develop.

DE82012915 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Considerations and Alternatives for the Selection and Use of Computer-Based Instructional Systems for Nuclear Safety.
C. Saylor. 16 Dec 81, 5p RFP-3307-Rev., CONF-820609-29-Rev.
Contract AC04-76DP03533
American Nuclear Society annual meeting, Los Angeles, CA, USA, 6 Jun 1982.

Training of reactor operators by use of computer-managed instruction and computer-assisted instruction are discussed, in relation to realistic expectations of the program's capabilities for assistance in nuclear training and certification. Criteria for selecting the system best suited for each organization are presented. (ERA citation 07:048107)

DE82013355 PC **A05**/MF **A01**
Maine Office of Energy Resources, Augusta.
Energy Education Teacher Needs Assessment Report.
1982, 77p DOE/NBM-2013355
Portions of document are illegible.
Microfiche only after original copies are exhausted.

In Maine, a state-wide teachers' survey was conducted to determine needs in energy education. Approximately 1700 surveys were sent to schools across the state in mid-May 1980. Five hundred and eighteen questionnaires (29% of those sent) were returned and processed through a standard SPSS computer program during the months of June-September 1980. Data were compiled and analyzed during the months of October 1980-January 1981. Information is presented on the interpretation and analysis of the survey data. Information on the survey questions is summarized. (ERA citation 07:044103)

DE82013457 PC **A02**/MF **A01**
Atlanta Univ., GA. Dept. of Chemistry.
Industrial Views and Expectations of Recent and New Chemistry Graduates.
E. Johnson. 1982, 4p CONF-820442-1
Contract W-7405-ENG-26
Industrial chemistry program symposium on industrial views and expectations of recent and new chemistry graduates, Atlanta, GA, USA, 16 Apr 1982.

No abstract available.

ED-200 243 Not available NTIS
Illinois Univ. at Urbana-Champaign. Computer-Based Education Research Lab.
Using the Computer to Foster Creative Interaction Among Students,
Sharon Dugdale. Oct 79, 19p.
Contract NSF-C-723
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

The network characteristics of the PLATO computer-based education system permit students to communicate not only with the computer, but with each other. This capability can be exploited in educationally significant ways. In addition to the social interaction which occurs when students help each other at the terminal and when they work together at a terminal in 2-student lessons, students can interact in real time from widely separated terminals, and they can see and learn from products generated by other students who were working not only at other places but at other times. This results in a variety of experience, a richness of expression, and a degree of motivation that is difficult or impossible to attain when students work at individual terminals in effective isolation from their peers.

ED-200 244 Not available NTIS
Illinois Univ. at Urbana-Champaign. Computer-Based Education Research Lab.
The PLATO V Terminal,
J. E. Stifle. Apr 78, 66p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This report provides a detailed description of the architecture and programming of the PLATO V terminal, which contains an 8080 microprocessor and is captable of being operated by programs located in a host computer. The terminal contains 8k of memory for storing local programs, a 4k ROM resident program which supervises terminal operation, a 2k ROM character set and 2k of spare ROM memory.

ED-201 322 Not available NTIS
Illinois Univ. at Urbana-Champaign.
Fractions Curriculum of the PLATO Elementary School Mathematics Project. 2nd Edition,
Skharon Dugdale, and David Kibbey. Jul 80, 159p
CERL-E-17
Grant NSF-C-723
For related document, see ED-128 176.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Designed to provide intermediate grade students with experience using fractions and mixed numbers, the PLATO sequence described in this manual includes interactive models for students to work with, as well as lessons for review, practice, or experience. These lessons are intended to be integrated with the classroom mathematics instruction, and introductory materials describe the implementation of the lessons, student assignments, the student session, data feedback to teachers, and supplementary materials. Topics covered include the meanings, ordering and equivalence, conversions, addition, subtraction, and multiplication of fractions and mixed numbers, as well as the meanings of decimal fractions and conversions to or from fractions whose denominator is a power of 10.

ED-201 340 Not available NTIS
Drexel Univ., Philadelphia, PA.
Individualized Instruction for Data Access (IIDA).
Quarterly rept. no. 8.
Mar 80, 72p
Grant NSF-DSI77-26524
Prepared in cooperation with Franklin Inst. Research Lab., Philadelphia, PA. For related documents, see ED 190 080-081.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

A brief summary of the progress and status of the Individualized Instruction for Data Access (IIDA) project is followed by a report dealing with two studies in the environment for which the system was intended. These field experiments were conducted with research engineers and chemists at two different Exxon Research and Engineering Company sites. The focus in the first study was upon the adequacy of IIDA as a system for retrieving information, while the second was upon IIDA as a way of providing online search training. Findings are discussed as they pertain to the goal of providing a method of allowing direct user access to bibliographic searching, and recommendations are made for future research. Copies of both the pre- and post-searching questionnaires are included.

ED-202 455 Not available NTIS
Illinois Univ. at Urbana-Champaign. Computer-Based Education Research Lab.
Using PLATO To Teach Problem Solving.
Esther R. Steinberg. Aug 80, 65p CERL-R-E-18
Contract N01-HD-0591
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This report describes the results of three studies which investigated the use of PLATO to teach problem solving. Subjects were 244 children from kindergarten through third grade. Abstracts, methods, results, and discussions are given for each of the studies. Results of this research led to a post hoc study which is described. Seven figures show sample displays and nine references are also given.

PB83-108688 PC **A05**/MF **A01**
Abt Associates, Inc., Cambridge, MA.

An Evaluation of the Nutrition Education and Training Program: Project Summary.
Final rept.,
Robert G. St. Pierre. 1 Oct 81, 77p
Contract USDA-53-3198-9-38

This report provides the results of a study sponsored by the Food and Nutrition Service during 1979 and 1980 of the Nutrition Education and Training Program. The study assessed the effects of nutrition education curricula implemented in Nebraska and Georgia on 3700 elementary school students' nutrition knowledge, self-reported food habits, willingness to try new foods, and individual plate waste. The study methodology provides an example of a true experimental research design applied in a field setting as well as a test of newly developed measures of nutrition program effectiveness.

PB83-108704 PC **A08**/MF **A01**
InterQual, Inc., Chicago, IL.
PSRO Physician Reviewer Training Manual.
Final rept.,
Nancy Berry. Aug 82, 154p
Contract HCFA-500-80-0040

In this training manual ten (10) modules are developed to assist the Professional Standards Review Organization (PSRO) review coordinator perform review. The modules deal with the reasons for the high cost of health care, give a background of the PSRO program and applicable Federal guidelines, deal with the use of criteria, describe the role of the review coordinator and physician reviewers, and discuss the discharge planning and utilization review process.

PB83-111955 PC **A08**/MF **A01**
Bureau of Economic Analysis, Washington, DC.
Local Area Personal Income, 1975-80. Volume 1: Summary.
Jun 82, 152p BEA-REM-82-02
See also Volume 2, PB83-111963.
Also available in set of 9 reports PC E99, PB83-111948.

The report includes methodology statement and classification of SMSA's. It shows total and per capita personal income by place of residence, personal income by type of payment, and labor and proprietors' income by major industry and place of work. Data is shown for all Regions, States, and Standard Metropolitan Statistical Areas.

PB83-111963 PC **A04**/MF **A01**
Bureau of Economic Analysis, Washington, DC.
Local Area Personal Income, 1975-80. Volume 2: New England Region.
Jun 82, 58p BEA-REM-82-03
See also Volume 1, PB83-111955 and Volume 3, PB83-111971.
Also available in set of 9 reports PC E99, PB83-111948.

The report shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data is shown for counties, and Standard Metropolitan Statistical Areas in the New England Region: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

PB83-111971 PC **A05**/MF **A01**
Bureau of Economic Analysis, Washington, DC.
Local Area Personal Income, 1975-80. Volume 3: Mideast Region.
Jun 82, 93p BEA-REM-82-04
See also Volume 2, PB83-111963 and Volume 4, PB83-111989.
Also available in set of 9 reports PC E99, PB83-111948.

The report shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data is shown for counties and Standard Metropolitan Statistical Areas in the Mideast Region: Delaware, District of Columbia, Maryland, New Jersey, New York, and Pennsylvania.

PB83-111989 PC **A08**/MF **A01**
Bureau of Economic Analysis, Washington, DC.
Local Area Personal Income, 1975-80. Volume 4: Great Lakes Region.
Jun 82, 159p BEA-REM-82-05
See also Volume 3, PB83-111971 and Volume 5, PB83-111997.
Also available in set of 9 reports PC E99, PB83-111948.

The report shows total and per capita personal income by place of residence; personal income by type of payment and labor and proprietors' income by major industry and place of work. Data shown for counties and Standard Metropolitan Statistical Areas in the Great Lakes Region: Illinois, Indiana, Michigan, Ohio, and Wisconsin.

PB83-111997 PC **A09**/MF **A01**
Bureau of Economic Analysis, Washington, DC.
Local Area Personal Income, 1975-80. Volume 5: Plains Region.
Jun 82, 199p BEA-REM-82-06
See also Volume 4, PB83-111989 and Volume 6, PB83-112003.
Also available in set of 9 reports PC E99, PB83-111948.

The report shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data is shown for counties and Standard Metropolitan Statistical Areas in the Plains Region: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.

PB83-112003 PC **A15**/MF **A01**
Bureau of Economic Analysis, Washington, DC.
Local Area Personal Income, 1975-80. Volume 6: Southeast Region.
Jun 82, 340p BEA-REM-82-07
See also Volume 5, PB83-111997 and Volume 7, PB83-112011.
Also available in set of 9 reports PC E99, PB83-111948.

The report shows total and per capital personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data is shown for counties and Standard Metropolitan Statistical Areas in the Southeast Region: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia.

PB83-112011 PC **A07**/MF **A01**
Bureau of Economic Analysis, Washington, DC.
Local Area Personal Income, 1975-80. Volume 7: Southwest Region.
Jun 82, 134p BEA-REM-82-08
See also Volume 6, PB83-112003 and Volume 8, PB83-112029.
Also available in set of 9 reports PC E99, PB83-111948.

The report shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data is shown for counties and Standard Metropolitan Statistical Areas in the Southwest Region: Arizona, New Mexico, Oklahoma, and Texas.

PB83-112029 PC **A05**/MF **A01**
Bureau of Economic Analysis, Washington, DC.
Local Area Personal Income, 1975-80. Volume 8: Rocky Mountain Region.
Jun 82, 90p BEA-REM-82-09
See also Volume 7, PB83-112011 and Volume 9, PB83-112037.
Also available in set of 9 reports PC E99, PB83-111948.

The report shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data is shown for counties and Standard Metropolitan Statistical Areas in the Rocky Mountain Region: Colorado, Idaho, Montana, Utah, and Wyoming.

PB83-112037 PC **A05**/MF **A01**
Bureau of Economic Analysis, Washington, DC.
Local Area Personal Income, 1975-80. Volume 9: Far West Region, including Alaska and Hawaii.
Jun 82, 92p BEA-REM-82-10
See also Volume 8, PB83-112029.
Also available in set of 9 reports PC E99, PB83-111948.

The report shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data is shown for all counties and Standard Metropolitan Statistical Areas in Alaska, Hawaii, and the Far West Region: California, Nevada, Oregon, and Washington.

PB83-112698 PC **A03**/MF **A01**
National Research Council, Washington, DC. Office of Scientific and Engineering Personnel.
Summary Report 1981: Doctorate Recipients from United States Universitites.
Annual rept. Jul 80-30 Jun 81,
Peter D. Syverson. Sep 82, 49p CHRSR-81
Grant NSF-SRS81-12839
See also PB82-113960. Sponsored in part by Department of Education, Washington, DC., National Institutes of Health, Bethesda, MD., and National Endowment for the Humanities, Washington, DC.

A summary of data gathered from the National Research Council's Survey of Earned Doctorates during the academic year 1980-81 is presented. The data were obtained from questionnaire forms filled out by graduates as they completed all requirements for their doctoral degrees. Between July 1, 1980 and June 30, 1981 a total of 31,319 research doctorates were awarded by U.S. universities. This is an increase of 1 percent from the number of doctorates awarded in 1980. Information is presented on the distribution of doctorate recipients by broad field and sex from 1960-1981 and on the primary sources of support used by graduate students to finance their doctoral education. Statistical tables provide the following information: number of doctorate recipients by sex and subfield; number of doctorate recipients by citizenship, racial/ethnic group, and subfield; profile of doctorate recipients by sex and field of doctorate; percentage of doctorate recipients by source of support in graduate school; Ph.D.'s by sex, field, and state in which degree was earned; and profile of doctorate recipients by racial/ethnic group and citizenship status.

PB83-113506 PC **A11**/MF **A01**
Case Western Reserve Univ., Cleveland, OH.
Organizational Assessments of the Effects of Civil Service Reform - Second Year Report for Fiscal Year 1981.
Interim rept. Oct 80-Sep 81,
Gregory H. Gaertner, and Karen N. Gaertner. Sep 81, 241p OPM/E-59
Contract OPM-23-80
See also PB82-161852.

This report discusses the implementation and impacts of the Civil Service Reform Act of 1978 on employees, agency operations, and mission accomplishment at five federal agency sites. Specific provisions of the Civil Service Reform Act which are discussed include the Senior Executive Service, performance appraisal, merit pay, labor-management relations, employee relations, and delegation of personnel management authorities.

PB83-113803 PC **A07**/MF **A01**
Michigan Univ., Ann Arbor. Inst. for Social Research.
Organizational Assessments of the Effects of Civil Service Reform: Second Year Report for Fiscal Year 1981.
Interum rept. Oct 80-Sep 81,
Stanley E. Seashore, and Cortlandt Cammann. 10 Sep 81, 150p OPM/E-58
Contract OPM-22-80
See also PB82-161860.

The report discusses the implementation and impacts of the Civil Service Reform Act of 1978 on employees, agency operations, and mission accomplishment at five federal agency sites. Specific provisions of the Civil Service Reform Act which are discussed include the Senior Executive Service, performance appraisal, merit pay, labor-management relations, employee relations, and delegation of personnel management authorities.

PB83-115345 PC **A03/MF A01**
Bureau of Labor Statistics, Washington, DC.
Linking Employment Problems to Economic Status: Data for 1980.
Final rept.,
Francis W. Horvath, Nancy F. Rytina, Sylvia L. Terry, and Paul M. Ryscavage. Sep 82, 48p LINK EM PROBS-80

This report contains data on the employment problems of workers and the impact of these problems on the economic status of their families and households. Statistics based on the March 1981 Current Population Survey of the Bureau of the Census for the year 1980 are presented. Data relating to earnings, involuntary part-time work, unemployment, and other aspects of inadequate employment have been cross-classified by family and household incomes.

PB83-851634 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Management Development. November, 1978-October, 1982 (Citations from the Management Contents Data Base).
Rept. for Nov 78-Oct 82.
Oct 82, 243p
Supersedes PB81-852071.

This bibliography contains citations of reports concerning the factors, principles of management training programs, and management development. Models, theories and development systems used in the U. S. and other countries to improve human skills and effectiveness are discussed. (This updated bibliography contains 350 citations, 150 of which are new entries to the previous edition.)

PB83-851808 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Industrial Management Development and Training. 1976-October, 1982 (Citations from the Paper and Board, Printing, and Packaging Industries Research Associations Data Base).
Rept. for 1976-Oct 82.
Oct 82, 204p
Supersedes PB81-867806.

This bibliography contains citations of reports which concern methods used and available to industry to develop and train management personnel. Management positions cover the range of supervisor up to top level management. Subject matter includes cognitive skills and the identification of such skills, teaching and learning methods, and evaluations of the methods. Applicability includes small and large corporations, marketing and production, industries with slow growth and industries faced with rapid technological developments, and special concerns and goals, such as increasing the number of women in management. Methodology includes the use of workshops, consultants, in-house procedures, and self-training courses. (This updated bibliography contains 146 citations, 11 of which are new entries to the previous edition.)

PB83-852202 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Human Resource Allocations. 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Oct 82.
Oct 82, 316p
Supersedes PB82-855917.

This bibliography contains citations concerning the use of personnel distribution models, selection and assignment of personnel, computer simulations for conducting manpower allocation assignments, analysis and planning for improved distribution of personnel, human resource allocation in dynamic environments and economic distribution models. Reports on the use of worker characteristics in job classification and assignment are also included. (This updated bibliography contains 249 citations, 35 of which are new entries to the previous edition.)

PB83-852228 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Human Resource Inventory Systems. 1974-October, 1982 (Citations from the Management Contents Data Base).
Rept. for 1974-Oct 82.
Oct 82, 66p
Supersedes PB81-863607.

This bibliography contains citations concerning human resource inventory systems. Topics include work force planning, human resource management, computer-aided personnel management, career planning, human assets accounting, and optimization with human resource utilization. (This updated bibliography contains 84 citations, 14 of which are new entries to the previous edition.)

5J. Psychology (Individual and Group Behavior)

AD-A119 520/5 PC **A03/MF A01**
Illinois Univ. at Urbana-Champaign. Human Attention Research Lab.
Processing with and without Long-Term Memory Modification: Attention, Level of Processing and Word Frequency.
Technical rept.,
Walter Schneider, and Arthur D. Fisk. Jul 82, 26p
Rept no. HARL-ONR-8203
Contract N00014-81-K-0034

In this research we examine the relationships among long-term memory (LTM) modification, attentional allocation and type of processing. The experiments test the proposal from automatic/controlled processing theory (Schneider and Shiffrin, 1977) that the modification of LTM occurs only during controlling processing and that stimuli can be automatically processed with no resulting LTM effect. Subjects in the first experiment were exposed to words while performing an intentional learning task; a semantic categorization task; a graphic categorization task; a distracting digit search task while trying to remember presented words; or a distracting task while trying to ignore the simultaneous words. In the distracting digit search conditions frequency judgments of words were at or near chance. Distractor learning for the semantic and intentional conditions was better than for graphic orienting, which was better than chance. In the second experiment, subjects were trained for approximately 5,000 trials to develop an automatic categorization response. The results showed no evidence of a frequency estimation ability and little recognition memory for words semantically categorized twenty times. The data support the hypothesis of a close connection between controlled processing and LTM storage and little if any link between automatic processing and LTM storage.

AD-A119 568/4 PC **A02/MF A01**
Australian Military Forces, Canberra. Psychological Research Unit (1).
Catalogue of Australian Army Psychology Corps Research Projects 1980-81.
Technical note,
T. A. Thurbon. Apr 82, 8p Rept no. TN-1/82

This catalogue of research conducted during 1980-81 is produced in accordance with the Operating Handbook for the Australian Army Psychology Corps 2D-3. It consists of all projects which were undertaken within the Corps which progressed to a stage where they were identifiable by a title. The catalogue summaries the returns of research submitted by AAPsych Corps Units/Appointments. Those projects which have been completed and resulted in the production of a report have been distributed on a scale determined by DPSYCH-A. Some reports were commissioned for/by a particular Unit or Appointment and distribution has been limited. Requests for limited distribution reports should be directed to DPSYCH-A. (Author)

AD-A119 630/2 PC **A03/MF A01**
Purdue Univ., Lafayette, IN. Dept. of Statistics.
A Stochastic Model for Paired Comparisons of Social Stimuli.
Technical rept.,
Axel Mattenklott, Klaus-J. Miescke, and Joachim Sehr. Jul 82, 33p Rept no. TR-82-20
Contract N00014-75-C-0455

A stochastic model for paired comparisons of multi-attribute social stimuli is proposed where one objective is to find the relative importance of the attributes for a judge. The model can be conceived as a special strict binary utility model, i.e. a BTL-model, and is related to the factorial model of Abelson and Bradley. The scale values of the stimuli are linear combinations of functions of the stimuli's attributes. The model does neither assume that the functions are fixed in advance nor that different judges have the same set of functions. The choice among such functions, however, is admitted only within a finite scope. Within the framework of exponential families, maximum likelihood estimators and tests are derived and applied to data coming from two psychological experiments. (Author)

AD-A119 699/7 PC **A02/MF A01**
Illinois Univ. at Urbana-Champaign. Human Attention Research Lab.
Attention Theory and Mechanisms for Skilled Performances.
Technical rept.,
Walter Schneider, and Arthur D. Fisk. Jul 82, 21p
Rept no. HARL-ONR-8201
Contract N00014-81-K-0034

Current attentional research and theory are related to the development of skilled performance. Emphasis is given to how performance changes with practice. Dual process attention theory is reviewed examining the distinction between automatic and controlled processing. The changing interactions between automatic and controlled processing in the development of skill are discussed. It is proposed that consistent practice produces automatic productions which perform consistent transformations in a heterarchial system. Automatic productions are proposed to: be modular; show high transfer; become resource free; not be under direct control; and be fast, accurate, and coordinated. Controlled processing is assumed to develop automatic processing, maintain strategy and time varying information, and perform problem solving activities. Perceptual data, some motor data, and several motor performance examples are presented to illustrate automatic/controlled processing effects. The relationship to current theories of motor skill are discussed. New research paradigms suggested by the current approach are discussed. (Author)

AD-A119 752/4 PC **A02/MF A01**
National Defense Univ., Washington, DC. Research Directorate.
Unit Cohesion: A Prerequisite for Combat Effectiveness.
Jeremy J. J. Phipps. 1982, 21p Rept no. NATL SEC AFFAIRS ISSUE PAPER-82-3

The purpose of this paper is to examine unit cohesion in US Army combat units in light of the key elements of cohesiveness, the present personnel turbulence problems, and some of the regimental-style systems being proposed or implemented. The very nature of weaponry available to armies today can produce a firepower and shock effect hitherto unknown in the history of armed conflict. Combat will be psychologically terrifying. Strong group loyalty and discipline will enable a combat unit to stay and fight together effectively against heavy opposition. Group loyalty and discipline occur when soldiers have worked together for long periods and have faith in the proven ability of their leaders. The individual replacement system currently used by the US Army to place people in job on an individual basis tends to destroy unit stability and cohesiveness. The problem has been identified, numerous studies have been conducted, far-reaching proposals are being approved, and challenging concepts are being adopted. The intangible benefits to be gained are long-term and difficult to measure. (Author)

AD-A119 781/3 PC **A05/MF A01**
Chicago Univ., IL. Center for Decision Research.
A Theory of Diagnostic Inference. II. Judging Causality.
Technical rept. No. 3,
Hillel J. Einhorn, and Robin M. Hogarth. Sep 82, 78p
Contract N00014-81-K-0314
See also report dated Jun 82, AD-A115 940.

Diagnosis involves inferring the process that generated a set of outcomes/results/symptoms. It is essentially causal rather than correlational, looks backward rather than forward, and is constructive in nature. A model of causal reasoning within diagnosis is presented that assumes judgments of causal strength to be a function of the strength of a hypothesis minus the strength of alternatives. However, such judgments are made conditionally on a background or field, analogous to the perception of figure against ground. Report demonstrates how changes in the causal background can lead to reversals in judgments of causal strength. The strength of an explanation is then considered as a function of cues to causality. These are multiple, pro-

babilistic indicators that capture aspects of the data and content inherent in a causal relation. Results show that people trade-off content and data-based cues to causality and, judged causal strength decreases as a function of the strength of alternatives. Results and a theoretical model are discussed with respect to the importance of expectations in defining causal relevance, rules for combining the cues to causality, and replacing vs. disconfirming hypotheses. Finally, the normative implications of the theory are considered with respect to three trade-offs: the acquisition of causal knowledge vs. superstition; order-out-of-chaos vs. creativity; and imagination vs. uncertainty.

AD-A119 790/4 PC **A03**/MF **A01**
Houston Univ., TX. Dept. of Psychology.
Perceived Punishment and Reward Values Assigned to Supervisor Actions.
Technical rept.,
Allan P. Jones, and Marianne Tait. 1 Apr 82, 37p
Rept no. J-ONR-82-1
Contract N00014-81-K-0824

The study investigated employee perceptions about the reward or punishment values inherent in a variety of supervisor actions. Actions viewed as most rewarding were generally actions which possessed: (a) public visibility, (b) tangibility, (c) implied esteem, and (d) long-term implications. Analyses of action viewed as punishing or aversive involved the following characteristics: (a) personal punishment reflecting informal acts with short-term consequences, (b) tangibility, (c) visibility, and (d) withholding of resources and information. Visibility appeared to be most strongly related to perceived severity. In contrast with suggestions in the literature (cf. Leon, 1981) substantial levels of agreement among raters were found for aversive as well as rewarding actions. Also reviewed are characteristics of leader actions that received mixed ratings from respondents. (Author)

PB83-107326 PC **A02**/MF **A01**
Helsinki Univ. of Technology, Espoo (Finland). Dept. of Technical Physics.
Classification of Phonemes by Learning Subspaces,
Teuvo Kohonen, Gabor Nemeth, Kalle-J. Bry, Matti Jalanko, and Heikki Riittinen. 1978, 23p TKK-F-A348, ISBN-951-751-345-3
Also pub. in ISSN-0355-7790.

Two pattern classification schemes with learning ability are introduced, and their application to the recognition of phonemes is reported in this paper. The basic classification algorithm applied in both schemes is known as the subspace method in which classes of patterns are defined as linear vector subspaces spanned by the prototypes, and the class affiliation of an unknown pattern vector is decided by comparison of its orthogonal projections on the various subspaces.

PB83-110668 PC **A02**/MF **A01**
National Park Service, Atlanta, GA. Southeast Regional Office.
Youth's Perceptions of National Park Service Rangers.
Research/Resources Management rept.,
F. P. Noe. Oct 77, 15p R/RM/SER-21

A total of 600 adolescents (301 males and 299 females) in grades 9-12 from 21 schools in the metropolitan Atlanta area were interviewed to gather information on their perceptions of National Park Service rangers. Four general dimensions of a ranger's role were described by the respondents: (1) personality, (2) interpersonal communications, (3) actions involving youth, and (4) physical appearance and gestures.

5K. Sociology

AD-A119 396/0 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
Army Needs Better Data to Develop Policies for Sole and Inservice Parents.
13 Sep 82, 44p Rept no. GAO/FPCD-82-50
Report to the Secretary of the Army.

This report discusses the actual and expected availability and performance of sole parents (service members with dependents and no spouse) and inservice parents (service members with dependents and married to other service members). Also, it identifies opportunities for the Army to improve its management of these individuals and to assure their availability and performance in the event of mobilization.

AD-A119 462/0 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Different Approaches to Monitoring Local Demographic Change,
Peter A. Morrison. May 82, 26p Rept no. RAND/P-6743

This paper addresses a common problem applied demographers face: how to update demographic variables for small areas in the years following the decennial census. Such postcensal updates serve important planning purposes; they also figure in various formulas for distributing aid from higher to lower levels of government.

AD-A119 472/9 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Techniques for Analysis of Migration-History Data from the ESCAP National Migration Surveys,
Julie DaVanzo. Mar 82, 38p Rept no. RAND/P-6760

This paper discusses methods for analyzing migration using life-history or longitudinal data. It is a revised version of a paper prepared for a technical working group meeting on migration and urbanization organized by the Population Division of ESCAP (Economic and Social Commission for Asia and the Pacific). The meeting was held at ESCAP in Bangkok, December 1-5, 1981. The Population Division of ESCAP, in collaboration with member countries, has developed a set of survey manuals for national migration surveys to be conducted in the ESCAP region in the early 1980s. A key component of the ESCAP survey instrument is a life-history questionnaire that elicits a retrospective accounting of migration and related life events. Although this paper focuses on the ESCAP life-history questionnaire, the issues and methods discussed herein are applicable to other life-history data (for example, the female and male retrospective life histories in Rand's Malaysian Family Life Survey and the Rand-INCAP Guatemalan Survey or to such longitudinal datasets as the University of Michigan Panel Study of Income Dynamics (the core dataset being analyzed by Rand's Population Research Center).

PB83-106856 PC **A20**/MF **A01**
National Inst. on Alcohol Abuse and Alcoholism, Rockville, MD. Alcohol Epidemiologic Data System.
Procedures for Assessing Alcohol Treatment Needs,
Charles Kaelber, and John Noble. Jun 82, 456p
NIAAA/NCALI-82-20

An alcohol treatment needs assessment methodology developed by the Alcohol Epidemiologic Data System (AEDS) is described. This methodology uses a normative approach for classifying the relationships between general and treatment populations, and provides the capability for analyzing the association between measures of need (in particular, alcohol-problem and demographic measures) and measures of demand such as modality-specific treatment utilization data. Preliminary test results from three States which participated in the development of this methodology are presented, to illustrate its application. The following items are appended: (1) a summary review of current alcoholism treatment needs estimation practices among the States; (2) SPSS analyses upon which the AEDS methodology is based; and (3) normative tables used to construct State and sub-State estimates of expected alcohol treatment.

PB83-107169 PC **A10**/MF **A01**
Nederlands Inst. voor Maatschappelijk Werk Onderzoek, The Hague.
Het Dagelijks Leven van Mensen met Epilepsie (Daily Life of People with Epilepsy).
Final rept.,
K. A. Gorter, and J. M. T. Zwaard. Oct 81, 203p
Text in Dutch. Prepared in cooperation with Hoofdgroep Gezondheitsonderzoek TNO.

The document reports on the social conditions of young epileptic adults. It contains a brief explanation of epilepsy as well as the work done in the preparation of the report. It contains a presentation on the many problems confronting epileptics: Problems in education, and the work being done in this area, the social position of epileptics, aspects in selecting a trade or profession, finding employment and chances for promotions, social functions including relations within and outside the family, tendency to withdrawal, discriminations, problems arising in partner selection, participation in social affairs, driving and obtaining a driving licence; a glimpse at their future. An appendix comes with the report.

PB83-108662 PC **A08**/MF **A01**
Mathtech, Inc., Princeton, NJ.
Student Participation, Meal Costs and Meal Production in School Foodservice Programs: A Literature Review.
Final rept.,
Jerome T. Bentley, Michael Kuhn, and Frederick Tiffany. Jun 82, 175p
Contract USDA-53-3198-9-57

This report provides a review of the literature related to three areas: student participation in the National School Lunch Program and School Breakfast Program; the cost of preparing and serving meals in school nutrition programs; and state-of-the-art techniques for the econometric modeling of cost and production functions for school feeding programs.

PB83-110262 PC **A03**/MF **A01**
National Highway Traffic Safety Administration, Washington, DC. Traffic Safety Programs.
Effectiveness and Efficiencies in Driver Licensing and Improvement.
Evaluation summary rept. 1966-81,
Wayne J. Tannahill, and William E. Tarrants. Mar 82, 39p DOT-HS-806 136

State driver licensing and improvement systems ensure that applicants meet minimum proficiency levels in areas identified as necessary for safe driving and that drivers falling below acceptable levels of performance are promptly identified through examinations and review of individual records. Programs are offered so that individuals may improve their performance and States may deny licensure to those who are unable to meet minimum standards. Driver records also support State enforcement and judicial programs through accurate driver identification and individual driving histories. Activities are included within three major components: Driver screening/license issuance; Driver improvement; and System support. This report discusses the impact target groups, the system support problems; it gives an overview of the program area and discusses the licensing 'countermeasures,' as well as their impact.

PB83-111062 PC **A04**/MF **A01**
Mathtech, Inc., Bethesda, MD.
Facilitating Community Support for Sex Education: A National Study.
Final rept.,
Peter Scales. Jun 81, 75p
Contract PHS-CDC-200-79-0930

In this country teenagers are getting pregnant, obtaining abortions, giving birth, getting raped, contracting sexually transmitted diseases -- all in increasingly great numbers. Many health professionals believe that effective sex education can both reduce these specific problems and promote physical and psychological health generally. Most parents and other adults support sex education programs. However, few schools offer comprehensive sex education programs and less than 10 percent of U.S. students receive comprehensive sex education. Thus, the Center for Health Promotion and Education at the Centers for Disease Control appropriated funds to identify the barriers to sex education and facilitated effective sex education at a local level. The primary arguments of sex education opponents can be grouped as follows: (1) rights and responsibilities of families; (2) characteristics of sex education programs; (3) effects of sex education programs; (4) support and need for sex education. Responses to a questionnaire listing 65 potential barriers to sex education found the single most highly rated barriers to be the administrators' fear of community opposition. Other barriers reflects beliefs that various community members have about sex education, training of staff, and insufficient year-by-year funding. From discussion of 23 local communities, data were gathered regarding community experiences in sex education programs.

PB83-111526 PC **A06**/MF **A01**
Science Management Corp., Washington, DC.
Status of State Legislation and Research on Health Insurance Coverage for Alcoholism Treatment,
W. Butynski. 1982, 125p NIAAA/NCALI-82-19
Contract PHS-ADM-281-81-008

This report was prepared for the National Institute on Alcohol Abuse and Alcoholism (NIAAA) in response to the interests and needs of alcoholism service providers, alcoholism constituency groups, State legislators, and the insurance industry in the area of health insurance coverage for alcoholism treatment. The report is divided into four chapters. The first deals with the status and provisions of State statutes and proposals. The second is concerned with research on health insurance reimbursement to alcoholism treatment programs and providers. Chapter three addresses significant factors and issues related to legislative proposals. A concluding discussion is presented on the development and presentation of legislative alternatives.

PB83-111716 PC **A09**/MF **A01**
Planologisch Studiecentrum TNO, Delft (Netherlands).
Wonen, Werken, Mobiliteit: Een Verkennende Studie (Housing, Jobs, Mobility: A Preliminary Study),
G. H. A. Hoogenboom. Jun 80, 198p 80/PS/204
Text in Dutch.

The idea of carrying out a strategic study of the factors which affect the mutual inter-relationship of housing and jobs and the related development of mobility in urban areas arose from the need to further develop policy lines set by the government. This report represents the preliminary stage of such a study. The systematic description of knowledge, insights and positions concerning the problems involved as well as the possible solutions presented here could form the basis for further research.

PB83-111823 PC **A06**/MF **A01**
Nederlands Inst. voor Praeventieve Gezondheidszorg TNO, Leiden.
Jongeren in de Bouw--Een Onderzoek Onder Jongeren Die als Timmerman of Metselaar in de Bouw Werken (Young People in the Building Industry--A Study on Young People Who Work as Carpenters or Bricklayers in the Building Industry),
R. W. M. Gruendemann, H. Hoolboom, and M. E. Valk-Kolff. Dec 79, 108p
Text in Dutch.

The young people questioned were, in general, content with their work and work situation in the construction industry. Also the experiences of their direct bosses were mostly positive. The results gave no clear indications of any general problems. However, there were indications of certain main problems: The young people had to get used to the fixed hours and to the work itself. Most of them felt at home in the work within one month. No special attention was paid to the reception and the supervision of the young people. Since especially the first work experience of young people is very important, more attention should be paid to them. It appears important to inform the young people beforehand of the activities expected of them and not to give the young people too much monotonous, untrained work to begin with but to give them more chance of learning their trade. Although much attention has lately been paid to the protection of work environments, it appeared that frequently there was a lack of means of protection or that means of protection, though present, were not used. Due to the limited number of jobs and possibilities of promotion, the young people ought to be informed beforehand of the limited possibilities in the sector to avoid disappointments. Approximately one third of those apprenticed complained of too little variation in their work and not enough possibilities to learn their trade. Link-up between vocational training and practice in building industry need to be improved. The fact that approximately 20 percent complained of occasional back troubles could be a possible indication of beginning health problems as a result of the work in the building sector.

PB83-113035 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Inst. for Program Evaluation.
Problems and Options in Estimating the Size of the Illegal Alien Population.
24 Sep 82, 44p GAO-IPE-82-9, B-209064

Illegal aliens are of concern to the Congress not only because of their illegal status but also because they may aggravate employment and community resource problems. As the Congress considers its response to the presence of illegal aliens in this country, accurate estimates of the size and growth of this population would be useful for deciding on policy options and for evaluating policy effectiveness. However, presently available estimates are imprecise and insufficiently reliable. GAO presents for congressional consideration three alternative ways of acquiring information relevant to policymaking on illegal aliens. In assessing the merit of these alternatives, the Congress should weigh the extent of its concern for reliable narrow-ranged estimates against the significant expenditure of resources that would be required.

PB83-113076 PC **A10**/MF **A01**
Swedish Council for Building Research, Stockholm.
Bibliography on Human Settlements in Developing Countries: References with Relevance to Eastern Africa,
Mirina Curutchet. 1982, 225p D12:1982
Prepared in cooperation with Lund Univ., (Sweden).

The major focus of this bibliography is the household and its relationship and interaction with the near environment. Unfortunately, little research is directly related to the micro-level, so research carried out at the macro-level which deals with problems which have a great impact at the micro-level have been included. Subject, personal author, and corporate author indexes make location of citations very easy.

PB83-113100 PC **A10**/MF **A01**
Economic and Social Commission for Asia and the Pacific (UN), Bangkok (Thailand).
Migration, Urbanization, and Development in Indonesia.
Rept. no. 3,
Graeme J. Hugo, Sam Suharto, and Ananto Sigit. 1981, 218p

This volume covers an analytical overview of the trends of urbanization, the patterns of migration, the levels of urban and rural development, and current policies which have a direct or indirect impact on population redistribution. It has used fully the available data and has drawn heavily on recent research carried out in Indonesia. The report's major sections are entitled: The urban and rural sectors in Indonesia - a comparison; population distribution and redistribution; levels, trends, and patterns of urbanization; patterns of interprovincial migration; characteristics of interprovincial migrants; and policies and programs affecting migration and urbanization in Indonesia.

PB83-113886 PC **A06**/MF **A01**
Administration on Aging, Washington, DC.
White House Conference on Aging, 1981. Volume 1: A National Policy on Aging.
Final rept.
1981, 119p
See also Volume 2, PB83-113894.
Also available in set of 3 reports PC E99, PB83-113878.

This statement of a National Policy on Aging is built on the comments, findings, and recommendations that emerged from the 1981 White House Conference on Aging and are appropriate to a national policy on aging for the next decade. In developing this report, staff reviewed the products of the Conference, including the Technical Committee reports, Conference Committee summary reports, and the results of the post-Conference survey of delegates and observers and other sources of information. The report is divided into five chapters addressing areas of major concern to the Nation and its elderly citizens: the economy, income in old age, health care, social benefits and services, and research. Issues are defined, policy options are explored, and recommendations are made in each area.

PB83-113894 PC **A07**/MF **A01**
Administration on Aging, Washington, DC.
White House Conference on Aging, 1981. Volume 2: Process Proceedings.
Final rept.
1981, 144p
See also Volume 1, PB83-113886 and PB83-113902. Also available in set of 3 reports PC E99, PB83-113878.

This volume traces the history of the Conference in some detail, from its inception as a joint resolution in both Houses of Congress in 1979, to the nationwide preparatory activities, to its culmination over two years later with the gathering of thousands of delegates and observers to discuss and debate issues and pass resolutions for the guidance of government, private institutions, and society as a whole.

PB83-113902 PC **A10**/MF **A01**
Administration on Aging, Washington, DC.
White House Conference on Aging, 1981. Volume 3: Recommendations, Post-Conference Survey of Delegates.
Final rept.
1981, 208p
See also Volume 2, PB83-113894.
Also available in set of 3 reports PC E99, PB83-113878.

Both the 1971 and 1981 White House Conferences on Aging faced the problem of organizing the national meeting to (1) enable delegates to discuss issues and develop recommendations on a wide variety of subjects in relatively small groups and (2) provide a mechanism for participants to express themselves on all recommendations. To help meet those two objectives the National Advisory Committee of the 1981 White House Conference on Aging voted to conduct a post-Conference survey of delegates and observers to gain a better insight as to the views of participants on all Conference recommendations. This volume of the final report presents the results of that survey.

PB83-114306 PC **A06**/MF **A01**
Swedish Council for Building Research, Stockholm.
Bibliography on Human Settlements with Emphasis on Households and Residential Environment - Kenya,
Carin Boalt, Suzanne Grant Lewis, and Dorothy Myers. 1982, 103p ISBN-91-540-3729-8, D13:1982
Prepared in cooperation with Zambia Univ., Lusaka, and Lund Univ. (Sweden).

The major focus of this bibliography is the household and its relationship and interaction with the near environment. Subject, personal author, and corporate author indexes make location of needed references easy.

PB83-114314 PC **A07**/MF **A01**
Swedish Council for Building Research, Stockholm.
Bibliography on Human Settlements with Emphasis on Households and Residential Environment - Zambia,
Ann Schlyter, and Jairus Chanda. 1982, 139p ISBN-91-540-3731-X, D14:1982
Prepared in cooperation with Zambia Univ., Lusaka, and Lund Univ. (Sweden).

The major focus of this bibliography is the household and its relationship and interaction with the near environment. Subject, personal author, and corporate author indexes make location of needed references easy.

PB83-114363 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
Army Needs Better Data to Develop Policies for Sole and Inservice Parents.
13 Sep 82, 45p GAO/FPCD-82-50

Service members with dependents and no spouse (sole parents) and those with dependents and married to other service members (inservice parents) are emerging in the active Army. Some commanders believe that, in the event of war, the parental responsibilities of these service members will take priority over their call to duty. To counteract this, the Army has considered discharging all sole and inservice parents or assigning them to positions coded as nondeployable. GAO recommends several actions to improve the Army's management of these service members.

PB83-114587 PC **A10**/MF **A01**
Wageningen Gezondheidsleer (Netherlands).
Medicijnvoorlichting aan Ouderen: Een Literatuurstudie en een Beschrijving van het Project 'Bejaarden en Medicijngebruik in Hillegom' (Medical Advice to Elderly Persons - Description of the Project 'Aged and the Use of Medicine in Hillegom').
Final rept.,
Giny Kooi. Jan 82, 223p 1982-115
Text in Dutch.

The object of the project was to ascertain the safe and conscientious use of medicine by the aged of Hillegom (a flower bulb growing community). The problems encountered in this respect are listed and examined. The report covers a wide range of activities with respect to the use of medicine on the part of the aged in Hillegom. This includes the development of informational activities such as the enlistment of the aid of other persons and organizations, written and spoken advice, etc. Included are also a review of the status of the project at Hillegom and recommendations thereto.

PB83-800581 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Population Mobility. 1979-October, 1982 (Citations from the NTIS Data Base).
Oct 82, 207p
Supersedes PB81-808248 and PB80-809627.

Research reports are cited concerning population migrations; census statistics on populations; the effects of housing, employment, and services availability on population movements; and population mobility between urban and rural areas. (This updated bibliography contains 198 citations, 40 of which are new entries to the previous edition.)

PB83-800672 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Housing Taxation and Financing by the Federal, State, and Local Governments. 1964-September, 1981 (Citations from the NTIS Data Base).
Oct 82, 300p
Supersedes PB81-807364 and PB80-809460.

The first section of this bibliography cites procedures by which federal, state, and local governments can help in financing housing. Most of these studies concern housing for the poor or elderly, although means of financing for the average citizen are also covered. The second section deals with housing taxes as they affect growth and revenue. (This updated bibliography contains 294 citations, 39 of which are new entries to the previous edition.)

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A119 686/4 Not available NTIS
Duke Univ. Medical Center, Durham, NC. Dept. of Biochemistry.
Parallel Electrostatic Effects in the Interactions of Superoxide with Cytochrome c and with Superoxide Dismutase,
Amelia Cudd, and Irwin Fridovich. 3 Jun 82, 3p ARO-18529.1-LS
Contract DAAG29-82-K-0020
Availability: Pub. in FEBS Letters, v144 n1 p181-182 Jul 82 (No copies furnished by DTIC/NTIS).

No abstract available.

PB83-851550 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Lecithins. June, 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for Jun 76-Oct 82.
Oct 82, 127p
Supersedes PB80-853658.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning the properties and reactions of lecithins. Biological effects of such materials as nitrogen dioxide, ozone, and radiation are also discussed. (This updated bibliography contains 100 citations, 53 of which are new entries to the previous edition.)

PB83-852210 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Lysosomes. 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Oct 82.
Oct 82, 171p
Supersedes PB82-858184.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning lysosomes and lysosomal membranes. Methods for separating and the effects of numerous substances on the lysosomal membrane are considered. Substances which stabilize the lysosomal membrane and substances which destroy the integrity of the membrane are discussed, as is the characterization of the lysosomal enzymes. (This updated bibliography contains 143 citations, 42 of which are new entries to the previous edition.)

6B. Bioengineering

DE82009076 MF **A01**
Los Alamos National Lab., NM.
Signal Processor for a Multiparameter Flow Cytometer Using Multilaser Excitation.
R. D. Hiebert, and J. A. Steinkamp. Jan 82, 43p LA-9066-MS
Contract W-7405-ENG-36
Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

An instrument has been designed for use in a multilaser flow system to measure particles and single biological cells. Signals from as many as six input parameters can be processed through a hard-wired chassis and a multichannel pulse-height analyzer. If an optional microcomputer-based data acquisition system is used, eight input parameters can be accepted. Signals are derived from Coulter-effect electrical detectors and photodetectors measuring fluorescence and small-angle light scatter along the flow stream. The versatile signal-processing chassis allows selective correlation of signals for simultaneous or sequential measurements according to geometric arrangement of the lasers, optical path elements, and detectors. (ERA citation 07:044582)

PAT-APPL-6-344 916 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
A Four Pivot Linkage to Simulate Head/Neck Kinematics.
Patent Application,
Edward B. Becker. Filed 2 Feb 82, 9p AD-D009 688/3
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The linkage has a pitch-roll link which rotates about a first pivot fixed in an upper body and which secures the lower end of a neck link in a second pivot. The upper end of the neck link is secured in a third pivot fixed in a yaw-pitch link which in turn articulates about a fourth pivot fixed in a head.

PAT-APPL-6-394 040 PC **A03**/MF **A01**
Department of the Air Force, Washington, DC.
Method and Apparatus for Objective Determination of Visual Contrast Sensitivity Function.
Patent Application,
Mark W. Cannon, Jr. Filed 30 Jun 82, 26p AD-D009 701/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method and apparatus for objectively determining the visual contrast sensitivity function of a human subject involves subjecting the vision of the human subject to a plurality of sine wave gratings differing in spatial frequency and contrast levels. As the subject views the grating patterns on a video monitor, the brain wave activity of the subject is detected and steady state Fourier spectra of the activity are recorded. In each spectrum corresponding to a grating pattern of a particular spatial frequency, a visual evoked potential component may be distinguished from noise by adjusting the contrast level of the grating pattern. A contrast threshold used in deriving the visual contrast sensitivity function is identified for each grating pattern of a particular spatial frequency by pinpointing the contrast level at which the visual evoked potential component becomes indistinguishable from noise in the spectrum. (Author)

PATENT-4 308 868 Not available NTIS
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Implantable Electrical Device.
Patent.
M. D. Jhabvala. Filed 27 May 80, patented 5 Jan 82, 5p N82-29863/9, PAT-APPL-6-153 246
Supersedes PAT-APPL-6-153 246, N80-27073 (18 - 17, p 2329).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A fully implantable and self contained device is disclosed composed of a flexible electrode array for surrounding damaged nerves and a signal generator for driving the electrode array with periodic electrical impulses of nanoampere magnitude to induce regeneration of the damaged nerves.

PB83-100529 PC **A05**/MF **A01**
Technische Hogeschool, Delft (Netherlands).
Mogelijkheden tot Concentratiemetingen met Behulp van Laser-Doppler-Signalen (Possibilities for Measuring Concentrations with the Help of Laser-Doppler-Signals),
J. A. Th. M. van den Broek. Jun 81, 77p MEAH-9
Text in Dutch.

In blood flow it is assumed that the concentration distributions of both blood cells and platelets are not uniform in a cross-sectional area of the flow. Most of the blood cells are in the central region of the flow while the maximum of the platelet concentration distribution will be outside the center of the flow (rotation-symmetrical). The aim of this research was to explore the possibilities of measuring the concentration distribution of platelets with a laser doppler velocimeter as the central part of the measuring equipment.

6C. Biology

AD-A119 546/0 PC **A04**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Endangered Species on U.S. Army Installations.
Final rept.,
W. D. Severinghaus, H. E. Balbach, and L. L. Radke. Aug 82, 73p Rept no. CERL-SR-N-134

A major environmental concern facing U.S. Army installation land managers and planners is the presence or potential presence of one or more endangered species. This report supplies two lists: one identifies endangered species by installation, and the other identifies the installations by endangered species. The use of these two lists will help the Army major commands and installations organize environmental surveys and communicate to solve endangered species management problems before possible mission impairment.

AD-A119 727/6 PC **A02**/MF **A01**
Army Engineer Topographic Labs., Fort Belvoir, VA.
Special Reflectance of Some Plant Indicators of Saline and Nonsaline Soils,
Melvin B. Satterwhite, and John W. Eastes. 23 Sep 82, 12p Rept no. ETL-R038

The task of finding a water supply in an arid region and determining something of its potability can be aided by using various remote sensing techniques for gathering geological, botanical, and terrain data. The objective of this study was to determine if salt-tolerant and salt-intolerant plant species could be distinguished by some

unique spectral bandpass in the 0.4 to 1.1 micrometers spectral region. A number of study sites in Nevada having either salt-tolerant or intolerant plant species were selected. Spectral measurements were made on six salt-tolerant and two salt-intolerant species during June-July when the plants were in full vegetative stage and not under any apparent water deficit stress. The reflectance spectra of the halophyte and nonhalophyte species showed that they could not be differentiated using selected bandpasses because the spectral characteristics (intensity and wavelength range) were too similar for both groups. Comparison of individual spectra showed some salt-tolerant and intolerant species could be distinguished by their reflectance spectra. Even so, different species occupying similar landform conditions had similar spectral reflectance signatures. The canopy geometry and background were important factors affecting these spectral signatures. (Author)

DE82007941 PC **A02**/MF **A01**
Case Western Reserve Univ., Cleveland, OH. Dept. of Biochemistry.
Repair of DNA Treated with gamma -Irradiation and Chemical Carcinogens. Progress Report, May 1, 1981-January 1, 1982.
D. A. Goldthwait. 1982, 4p DOE/EV/02725-07
Contract AS02-76EV02725

Research progress for the period May 1981 to January, 1982 is reported. The repair of nucleosomal DNA by 3-methyldenine DNA glycosylase was investigated. (ERA citation 07:048183)

DE82013455 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Phenotypic Changes in Epithelial-Cell Population Undergoing Neoplastic Transformation in Vitro.
G. R. Braslawsky, S. J. Kennel, and P. Nettesheim. 1982, 5p CONF-820439-1
Contract W-7405-ENG-26
Symposium on genetics mechanisms of carcinogenesis, Gatlinburg, TN, USA, 11 Apr 1982.

Changes were examined in DNA content and cell surface antigen expression (two unrelated cell markers) as carcinogen altered rat tracheal cells acquire the neoplastic phenotype in vitro. The coordinate change of DNA content and antigen expression as cultures change from preneoplastic to neoplastic with no detectable intermediate phenotypes indicate that neoplastic potential is acquired in a single (or a few rapid sequential) changes in this in vitro model of progression. (ERA citation 07:044779)

N82-31888/2 PC **A03**/MF **A01**
Tufts Univ., Medford, MA. Dept. of Physics.
Diffusion Mediated Localization on Membrane Surfaces.
D. L. Weaver. Aug 82, 26p NAS 1.26:166386, NASA-CR-166386
Contract NCA2-OR785-201

Using the model of a cell membrane of a spherical surface in which membrane components may diffuse, the rate of localization due to trapping under diffusion control has been estimated by computing an analytical expression for the mean trapping time including the possibilities of a trapping probability less than one and/or the establishment of an equilibrium at the trap boundary.

N82-31889/0 PC **A02**/MF **A01**
Istituto Superiore di Sanita, Rome (Italy). Lab. delle Radiazoni.
Electron Paramagnetic Resonance Assignment: An Analysis of Methods Used for Biological Samples Analisi Delle Methodiche Per Misure di Epr Su Campioni Biologici.
F. Ianzini, and A. Rosi. Mar 82, 25p ISS-T-82/2, ISSN-0390-6485
In Italian; English Summary.

Sample conditioning methods for freeze-drying, homogenization and freezing, used for the electron paramagnetic resonance assessment of biological molecular activity in cells, tissues and fluids are described. The procedure based on 77 K freezing is found to be the most suitable for fluids and tissues analysis.

PB83-110635 PC **A02**/MF **A01**
National Park Service, Atlanta, GA. Southeast Regional Office.
Impact of Treated Sewage on the Aquatic Invertebrate Fauna, Clark's Fork Creek, Kings Mountain National Military Park.
Research/Resources Management rept.,
D. L. Stoneburner. Sep 76, 13p R/RM/SER-5

Aquatic macroinvertebrate and diatom communities in Clark's Fork Creek were examined to assess the impact of the effluent from a newly installed package sewage treatment plant at Kings Mountain National Military Park. These communities were sampled 6 months before and 6 months after the plant became operational. Diversity and eveness indices were computed from the macroinvertebrate samples and used for a comparative analysis.

PB83-110726 PC **A04**/MF **A01**
Great Smoky Mountains National Park, Gatlinburg, TN. Uplands Field Research Lab.
Preliminary Status of Rare Plants in Great Smoky Mountains National Park.
Research/Resources Management rept.,
Susan P. Bratton. Mar 79, 51p NPS/R/RM-25

The purpose of this report is to review the available state and national lists of endangered plants and to determine which species are in need of research or management in Great Smoky Mountains National Park.

PB83-112235 PC **A03**/MF **A01**
Texas Parks and Wildlife Dept., Austin. Coastal Fisheries Branch.
Assessment of Bottom Longline Fishing off the Central Texas Coast.
Management data series,
Terry J. Cody, and R. M. Avent. 1980, 32p TPWD-MDS-16, NOAA-81021202

From October 1977 through September 1979 the Texas Parks and Wildlife Department conducted a study to assess and evaluate the commercial potential of bottom longline gear as a harvest method for finfish stocks off the central Texas coast. Sampling was conducted quarterly in 10-fm increments out to the 50 fm using 1200-ft sections of halibut-type longline gear and tuna circle hooks. A total of 469 fish representing 32 species was caught at 79 stations. The Atlantic sharpnose shark (Rhizoprionodon terraenovae) was the most abundant species in number (310) and weight (2958 lb) representing 66.1% of the total fish caught and 54.8% of the total biomass. The catch data demonstrated that bottom longlining at depths less than 50 fm is not likely to offer a practical commercial alternative for shrimping fleets unless underutilized species (mainly sharks) could be marketed.

PB83-113654 PC **A02**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Bald Eagle Winter Habitat on Southwestern National Forest.
Forest Service research paper (Final),
Teryl G. Grubb, and Charles E. Kennedy. Sep 82, 19p FSRP-RM-237

An extensive, winter survey and habitat study in 1978 located about 100 bald eagles in Arizona and 350 in New Mexico. Perching habits varied greatly but predictably. Study results offer some qualitative insights for habitat managers.

PB83-113720 PC **A03**/MF **A01**
International Center for Living Aquatic Resources Management, Manila (Philippines).
ICLARM Newsletter, Volume 5, Number 2, April 1982. Fisheries Information: Bibliographies, Databases, Directories, Information Systems, Reprints, and Statistics,
Jay Maclean, R. Needham, T. V. R. Pillay, Carol B. Rideout, and Lynda Cowan. Apr 82, 37p

This issue of the International Center for Living Aquatic Resources Management Newsletter has articles on: Fisheries literature services - an overview; ASFIS - vehicle for international exchange of scientific information; The ADCP aquaculture information system; the aquaculture database; fisheries information retrieval in Japan; Marine fisheries statistics in Southeast Asia - a critical appraisal; SCSP, RegTuna and statistics; uniform tuna catch statistics in the Central and Western Pacific; reprints as a neglected resource; fisheries information in the South Pacific; finding fisheries facts in Southeast Asia; fisheries bibliographies, directories, and current awareness, SEAFDEC information services; and newsbriefs.

6D. Bionics

AD-A119 507/2 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Computer Science.
On the Movement of Robot Arms in 2-Dimensional Bounded Regions.
Technical rept.,
John E. Hopcroft, Deborah A. Joseph, and Sue H. Whitesides. Mar 82, 34p Rept no. CU-CSD-TR-82-486
Contract N00014-76-C-0018, Grant NSF-MCS81-01220

The classical mover's problem is the following: can a rigid object in 3-dimensional space be moved from one given position to another while avoiding obstacles. It is known that a more general version of this problem involving objects with movable joints is PSPACE complete, even for a simple tree-like structure moving in a 3-dimensional region. In this paper, we investigate a 2-dimensional mover's problem in which the object is a robot arm with an arbitrary number of joints. In particular, we give a polynomial time algorithm for moving an arm confined within a circle from one given configuration to another. We also give a polynomial time algorithm for moving the arm from its initial position to a position in which the end of the arm reaches a given point within the circle. (Author)

6E. Clinical Medicine

AD-A119 473/7 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Outliers Matter in Survival Analysis,
Gaineford J. Hall, William H. Rogers, and Daryl Pregibon. Apr 82, 41p Rept no. RAND/P-6761

Generally, but not always, the most influential observations (cases) possess the largest Cox-Snell residuals. A case which has a variable far out in the factor space may be more influential than a case with a large residual. Either kind of outlier can affect inference. The plots of the log survival curve of the residuals and the corresponding variance-stabilized transformation generally do not indicate the importance (influence) of large residuals on estimated parameters. Regression parameter estimates from the Cox proportional hazards model are just as sensitive to influential cases as are fully parametric models. Influential observations often suggest other modelling deficiencies, such as a poorly-specified factor, nonproportional hazards, or an omitted variable. The analyses indicate how broadly-based the conclusions are. We found no evidence to support automatic exclusion of outlying observations. Outlier diagnostics based on linearization (the log-likelihood and its derivatives) work very well. The measure of importance tends to be compressed at its upper end, so the impact of very influential observations tends to be understated.

AD-A119 488/5 PC **A02**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Effects of Different Surgical Stresses on Hematologic and Blood Chemistry Values in Dogs,
Robert E. Schmidt, and J. Lee Booker. 1982, 6p Rept no. SAM-TR-81-298
Pub. in Jnl. of the American Animal Hospital Association, v18 p758-762 Sep/Oct 82.

No abstract available.

AD-A119 564/3 PC **A02**/MF **A01**
Army Inst. of Surgical Research, Fort Sam Houston, TX.
The Role of Leukocyte Endogenous Mediator (Endogenous Pyrogen) in Inflammation,
Michael C. Powanda. 1982, 13p
Pub. in Inflammatory Diseases and Copper, p31-43 1982.

No abstract available.

AD-A119 585/8 PC **A02**/MF **A01**
Army Inst. of Surgical Research, Fort Sam Houston, TX.
Pox Virus Keratitis in a Rabbit,
C. G. McLeod, Jr., and P. C. Langlinais. Nov 81, 3p
Pub. in Veterinarian Pathology, v18 n6 p834-836 Nov 81.

No abstract available.

AD-A119 593/2 PC **A07**/MF **A01**
Army Aeromedical Research Lab., Fort Rucker, AL.
US Army Aeromedical Research Laboratory Annual Progress Report, FY 1981.
Rept. for 1 Oct 80-30 Sep 81,
Stanley C. Knapp. Oct 81, 131p

The annual progress report gives the FY81 personnel and funding strength of the US Army Aeromedical Research Laboratory. It outlines the nine scientific programs being pursued by the Laboratory. Those programs are: visual, auditory, and vibration/impact physiology; auditory effects of blast overpressure; noise hazards of combat vehicles; impact biodynamics of crashworthiness and personnel armor; vibration hazards of combat vehicles; crew life support systems biotechnology; sensory limitations and man/machine systems; biomedical aspects of crew workload, selection and staffing, and antidote/agent effects on the visual system. (Author)

AD-A119 633/6 Not available NTIS
Army Inst. of Surgical Research, Fort Sam Houston, TX.
Cortisol and Corticotrophin in Burned Patients,
George M. Vaughan, Richard A. Becker, John P. Allen, Cleon W. Goodwin, Jr., and Basil A. Pruitt, Jr. 1982, 11p
Presented at the Annual Session of the American Association for the Surgery of Trauma (41st), 17-19 Sep 81, Hot Springs, VA.
Availability: Pub. in Jnl. of Trauma, v22 n4 p263-273 Apr 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 734/2 PC **A04**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. School of Medicine.
Adjuvant Effects on Immune Responses to Biological Agents.
Annual progress rept. 1 Jul 78-30 Jun 79,
Norman D. Anderson. Sep 79, 73p
Contract DAMD17-74-C-4095

This report demonstrates that modification of the lymphocyte surface by ligands, protease or glycosidase treatment, and galactose oxidase blocks the entry of lymphocytes into lympoh nodes. Successful attachment of these recirculating lymphocytes to the venular surfaces during entry appear to require energy generated by anaerobic glycolysis. The membrane components' interaction during this intercellular adhesion appear to be modulated by the cytoskeleton, and pharmacologic disruption of this fibrillar network of cytoplasmic proteins block lymphocyte attachment to high endothelial venules in vivo. Further study of these membrane interactions should now be feasible using recently developed methods for isolating and culturing rat vascular endothelium. Additional observations on lymphocyte chemotaxis have demonstrated that a high molecular weight factoar found in normal serum and plasma is selectively chemotactic for T lymphocytes. This factor has been partially purified and characterized, but its biologic relevance is uncertain as it differs from the lymphotactins described by other investigators. Several models of lymphocyte migration into peripheral inflammatory sites have been devised and the available evidence indicates that the types of lymphocytes, surface interactions and chemoattractants found within these lesions are quite different from those regulating cellular traffic into lymph nodes. (Author)

AD-A119 768/0 PC **A19**/MF **A01**
Army Inst. of Surgical Research, Fort Sam Houston, TX.
US Army Institute of Surgical Research Annual Research Progress Report FY 1981.
Rept. for 1 Oct 80-30 Sep 81,
Basil A. Pruitt, Jr. 1 Oct 81, 435p

This report documents the clinical and laboratory activities of the US Army Institute of Surgical Research during the fiscal year 1981. These activities include patient care, clinical investigation and laboratory research in the areas of burn injury and general trauma. Special emphasis is placed on the clinical management of burned patients and on studies related to prevention and treatment of burned wound infection. (Author)

AD-A119 769/8 PC **A02**/MF **A01**
American Foundation for Biological Research, Rockville, MD.
Schistosome Materials for Vaccine Development.
Annual rept. no. 2, 30 Sep 81-1 Oct 82,
M. A. Stirewalt, and F. A. Lewis. 28 Sep 82, 8p

Parasite materials (S. mansoni) were supplied to investigators at the National Naval Medical Research Institute in Bethesda, Maryland for immunoparasitological research. (Author)

AD-A119 789/6 PC **A02**/MF **A01**
Dwight David Eisenhower Army Medical Center, Fort Gordon, GA. Dept. of Clinical Investigation.
Diagnosis and Treatment of Phantom Limb Pain: Mechanisms and Option FLow Sheet.
Special study,
Richard A. Sherman. Aug 82, 13p Rept no. DDEAMC-81-19-1

The basic mechanisms underlying phantom pain as well as the diagnostic and treatment procedures are difficult to keep track of and coordinate during both teaching and clinical application. A figure summarizing the major mechanisms is provided along with the rational upon which each treatment is based. A flow sheet outlining when to do each diagnostic and treatment procedure and providing options based on results of each is provided to simplify teaching and keeping track of progress through a complex process. Only treatment with at least a fair success record on follow-up are included. (Author)

DE82009726 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Digital Filtering in a Disease Detection System.
R. R. Brown. Feb 82, 22p LA-8973-MS
Contract W-7405-ENG-36
Portions of document are illegible.
Microfiche only after original copies are exhausted.

A low-pass, nonrecursive digital filter was designed to process data in an automated enzyme immunoassay system. The software implemented filter was installed in the Intel 80/10 system controller. A low-speed sample rate of three samples per second allowed the filter algorithm to be programmed in the high-level FORTRAN language with a resultant execution speed of 0.6 seconds per data array. Fourier techniques are used to derive a zero phase shift filter algorithm from a frequency domain prototype. The resulting alogrithm is modified by a Hamming window to reduce transients and Gibbs phenomenon oscillations. Observations on the effectiveness of the filter under full system operation indicate a 90% data recovery rate. (ERA citation 07:048972)

DE82014678 PC **A02**/MF **A01**
Pittsburgh Univ., PA.
Investigation of Lead, Carbon Monoxide and Thiocyanate in Blood Samples from the Third National Health and Nutrition Evaluation Survey (HANES III). Progress Report, August 1, 1981-March 15, 1982.
1982, 9p DOE/EV/04552-T1
Contract AS02-77EV04552

A number of conclusions are apparent from the data. First, among the children 3 to 11 years of age, the mean COHb is somewhat higher for the large cities than for the smaller cities and rural area. These observations indicate that general air pollution by CO in the metropolitan areas is not contributing greatly to exposure to the nonsmoking population. There is little indication that white and black children differ to any significant extent. Second, for the adults who reported never smoking, the urban-rural gradient is somewhat greater than for the children, although it is still relatively small. Confounding by occupational exposures to CO among the adults contributes to this larger urban-rural gradient. The difference between blacks and whites, with blacks definitely higher, is explained by greater likelihood of occupational exposures. In summary, analysis of carboxyhemoglobin by degree of urbanization shows an urban-rural gradient for both children and adults, with the results for adults affected by the likelihood of occupational exposures, especially for the blacks.

DE82902579 MF **A01**
Centro Informazioni Studi Esperienze, Milan (Italy).
In-Vivo Recording of Blood-Velocity Profiles and Studies in Vitro of Profile Alterations Induced by Known Stenoses.
M. Bassini, E. Gatti, T. Longo, G. M. Martinis, and P. Pignoli. 1980, 32p CISE-1655, CONF-8011150-1
International conference of the Cardiovascular System Dynamics Society: peripheral vascular hemodynamics: basic and clinical aspects, Miami, FL, USA, 12 Nov 1980, Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

Recordings of blood velocity profiles and of their behaviour in the time domain in some peripheral human vessels (carotid arteries, and limbs vessels) are reported. Measurements were obtained with a pulsed ultrasonic instrument based on the analysis of the cross-correlation function of blood diffused echoes. The alterations of blood velocity profiles and of the velocity in the time domain induced by known stenosis, were studied in vitro as a function of the distance between stenosis and measuring point, and position of the sample volume along the diameter. These studies may be useful for a better comprension of blood velocity measurements made with ultrasound equipments for clinical non-invasive diagnostic purposes. (ERA citation 07:044765)

HRP-0904367/0 PC **A02**/MF **A01**
Northern Illinois Univ., De Kalb.
Voluntary Termination: HSA Adaptation to Reduce Federal Grants in Southwest Connecticut.
Technical assistance paper no. 2,
Irene Rubin. Sep 81, 13p

This is a report on the second of three site visits undertaken to determine the responses of HSAs to declining Federal support. These three sites were chosen to represent three response patterns, surviving through increasing the level of State and local support, closing down before the end of Federal funding, and creating a coalition of business interests to be a possible successor to the HSA. The second site visited was the Southwest Connecticut Health Systems Agency, which chose to close down before the end of Federal funding.

HRP-0904378/7 PC **A03**/MF **A01**
Institute for Health Planning, Inc., Madison, WI.
Health Planning in the United States.
Sep 82, 29p

In reviewing the development, challenges, and accomplishments of planning in the health field, it is necessary to focus on one set of descriptors for organizational purposes. In this discussion, three elements have been so selected--institutional/organizational planning, community-level planning, and state-level planning.

HRP-0904381/1 PC **A03**/MF **A01**
Bureau of Health Planning, Hyattsville, MD.
Performance Evaluation Program: Study IV. Long Term Care.
Feb 82, 38p
See also Study 2, HRP-0903496.

This case study is one of the products of a short-term evaluation of health systems agency activities concerning long-term care and its alternatives. The evaluation was carried out by staff of the Bureau of Health Planning as part of the implementation of the performance evaluation program. A telephone survey was conducted to obtain nationwide information on planning agency activities in long-term care. Selected agencies were then visited to study their programs in greater depth. One of these was the Florida Gulf Health Systems Agency.

N82-31890/6 PC **A03**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
A Technique for Long-Term Measurements of Thyroid Function in Beagle Dogs Using Iodine 125.
O. Wilson, J. M. Stone, and D. E. Monty. Dec 79, 39p FOA-A-59003-H3
Sponsored by Swedish Medical Research Council.

A procedure for measuring thyroid uptake and retention of I 125 is described. After a single dose of 1.85 MBq the thyroid retention curve can be followed for 3 to 6 months or more. Physiologic changes and experimental manipulations of thyroid function are observed by changes in the slope of the release curve. The form of the slope of the curve is useful for determining biological half life, evaluating changes in turnover, calcu-

lating release rate exponentials, and for analyzing iodine compartmental distribution. Backscatter and attenuation affect measurements of I 125 uptake more than measurements made with I 131. The major disadvantage of I 125 is the extent of its absorption in tissues, which is partially counterbalanced by backscatter from the tissues surrounding the thyroid. Backscatter in the Lucite neck phantom can exceed attenuation.

N82-31922/9 PC**$7.00**
National Aeronautics and Space Administration, Washington, DC.
Aerospace Medicine and Biology: A Continuing Bibliography with Indexes.
Jul 82, 111p NAS 1.21:7011(234), NASA-SP-7011(234)

This bibliography lists 356 reports, articles and other documents introduced into the NASA scientific and technical information system in June 1982.

PB82-222878 PC**$11.00**/MF **A01**
Centers for Disease Control, Atlanta, GA. Lab. Improvement Program Office.
Quality Control for Immunologic Tests,
Roger N. Taylor, Alan Y. Huong, Karen M. Fulford, Vincent A. Przbyszewski, and Thomas L. Hearn. Jun 79, 120p HHS/CDC/LIPO-82-003

This monograph is intended to be a general guideline to bench level technologists in establishing and maintaining an effective and efficient quality control program. It is intended as a supplement to the training manuals which indicate specific quality control procedures for specific tests. The purpose is to stimulate quality control consciousness and thinking and to provide a source of references for additional literature, methods, and standards.

PB82-922810 PC**$7.25**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Diagnosis and Treatment of Pancreatic Cancer.
Oncology overview.
Sep 82, 126p NCI/ICRDB/OT-82/10

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Radiological diagnosis of pancreatic cancer; Biopsy and cytology in the diagnosis of pancreatic cancer; Pathology and morphology of pancreatic cancer; Staging and prognosis of pancreatic cancer; Biological and immunological markers in the diagnosis of pancreatic cancer; Surgical treatment of pancreatic cancer; Drug therapy of pancreatic cancer; Radiation therapy of pancreatic cancer; Selected studies on the epidemiology of pancreatic cancer; Clinical correlates and syndromes associated with pancreatic neoplasia.

PB82-922909 PC**$6.50**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Short-Term Test Systems for Potential Mutagens and Carcinogens: V. In vivo Tests for Chromosomal Damage.
Oncology overview.
Sep 82, 114p NCI/ICRDB/OK-82/09
See also PB82-922908.

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Detection of chromsomal damage in mammals; Tests measuring DNA damage and DNA repair in mammals; Dominant-lethal tests in mammals; Tests for effects in mammalian skin and hair; Other tests for mutagenicity in mammals; General reports and evaluations of various mammalian test methods; Mutagenicity testing in non-mammalian systems.

PB82-922910 PC**$5.25**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Short-Term Test Systems for Potential Mutagens and Carcinogens: VI. In vitro Tests for Chromosomal Damage.
Oncology overview.
Sep 82, 71p NCI/ICRDB/OK-82/10
See also PB82-922909.

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Tests for chromosomal aberrations; Tests for sister chromatid exchange; The micronucleus test; Tests for the suppression of mitotic indices and chromatid translocations; Tests for DNA fragmentation; Reviews of in vitro tests for chromosomal damage.

PB82-922912 PC**$6.00**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Naturally Occurring Dietary Carcinogens of Plant Origin.
Oncology overview.
Sep 82, 86p NCI/ICRDB/OK-82/12

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Epidemiological associations of naturally occurring dietary carcinogens with human cancers; Occurrence, identification, and isolation of naturally occurring dietary carcinogens of plant origin; Tests for mutagenic activity of naturally occurring dietary carcinogens of plant origin; Metabolism and activation of naturally occurring dietary components of plant origin; Carcinogenicity studies of specific naturally occurring dietary components of plant origin in experimental systems.

PB83-104281 PC **A02**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
National Survey of Personal Health Practices and Consequences - Appendix IV. Micro-data Tape Documentation for Wave I and II,
Patricia M. Golden. Sep 82, 11p NCHS/DF-82/019D
For system on magnetic tape, see PB83-104323.

The National Survey of Personal Health Practices and Consequences (NSPHPC) was conducted by the National Center for Health Statistics (NCHS) as a part of the effort to meet the data needs of the prevention initiative of the U.S. Department of Health and Human Services. The survey is a national probability sample selected using random-digit dialing techniques and was conducted in two waves of interviews among a panel of non-institutionalized civilian persons aged adult 20-64 years in the coterminous United States. Wave I was conducted in the Spring of 1979 and comprises data for 3025 respondents. Wave II was conducted 1 year later and comprises data for 2436 of the Wave I respondents.

PB83-104299 PC **A03**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
National Survey of Personal Health Practices and Consequences - Appendix II. Micro-data Tape Documentation for Wave I and II,
Patricia M. Golden. Sep 82, 38p DHHS/PUB/PHS-81-1163, SER-15-2, NCHS/DF-82/019C
Supersedes PB82-157280. For system on magnetic tape, see PB83-104323.

The National Survey of Personal Health Practices and Consequences (NSPHPC) was conducted by the National Center for Health Statistics (NCHS) as a part of the effort to meet the data needs of the prevention initiative of the U.S. Department of Health and Human Services. The survey is a national probability sample selected using random-digit dialing techniques and was conducted in two waves of interviews among a panel of non-institutionalized civilian persons aged adult 20-64 years in the coterminous United States. Wave I was conducted in the Spring of 1979 and comprises data for 3025 respondents. Wave II was conducted 1 year later and comprises data for 2436 of the Wave I respondents.

PB83-104307 PC **A04**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
National Survey of Personal Health Practices and Consequences - Appendix I. Micro-data Tape Documentation for Wave I and II,
Patricia M. Golden. Sep 82, 57p DHHS/PUB/PHS-81-1162, SER-15-1, NCHS/DF-82/019B
Supersedes PB82-157298. For system on magnetic tape, see PB83-104323.

The National Survey of Personal Health Practices and Consequences (NSPHPC) was conducted by the National Center for Health Statistics (NCHS) as a part of the effort to meet the data needs of the prevention initiative of the U.S. Department of Health and Human Services. The survey is a national probability sample selected using random-digit dialing techniques and was conducted in two waves of interviews among a panel of non-institutionalized vicilian persons aged adult 20-64 years in the cuterminous United States.Wave I was conducted in the Spring of 1979 and comprises data for3025 respondents. Wave II was conduced 1 year later and comprises data for 2436 of the Wave I respondents.

PB83-104315 PC **A07**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
National Survey of Personal Health Practices and Consequences - Micro-data Tape Documentation for Wave I and II,
Patricia M. Golden. Sep 82, 141p NCHS/DF-82/019A
Supersedes PB82-157272. For system on magnetic tape, see PB83-104323.

The National Survey of Personal Health Practices and Consequences (NSPHPC) was conducted by the National Center for Health Statistics (NCHS) as a part of the effort to meet the data needs of the prevention initiative of the U.S. Department of Health and Human Services. The survey is a national probability sample selected using random-digit dialing techniques and was conducted in two waves of interviews among a panel of non-institutionalized civilian persons aged adult 20-64 years in the coterminous United States. Wave I was conducted in the Spring of 1979 and comprises data for 3025 respondents. Wave II was conducted 1 year later and comprises data for 2436 of the Wave I respondents.

PB83-106872 PC**$12.00**/MF **A01**
Centers for Disease Control, Atlanta, GA. Lab. Improvement Program Office.
Laboratory Methods for Detecting Rabies,
Wallis M. Velleca, and Francis T. Forrester. Sep 81, 166p HHS/CDC/LIPO-81/0007
Errata sheet inserted.Color illustrations reproduced in black and white.

This is a training manual, for CDC Course 8260-C, 'Laboratory Methods for Detecting Rabies'. This manual describes the recommended laboratory techniques for detecting rabies virus in clinical specimens and for detecting antibody to rabies virus in human and animal sera. Collection, shipping and processing of specimens is fully described. Protocols for the immunofluorescence, mouse inoculation and Seller's staining techniques for detecting rabies virus and the rapid fluorescent focus inhibition test and neutralization test in mice for detecting antibody to rabies are presented in detail. Principles, comparative sensitivities, and interpretations are discussed for each of the recommended tests. This manual is designed as a teaching aid to help develop competence in detecting rabies infections.

PB83-107219 PC **A02**/MF **A01**
Amsterdam Univ. (Netherlands). Subfaculteit Tandheelkunde.

Tandheelkundige Behandeling van Geestelijk Gehandicapten en Zeer Angstigen (Dentist Treatment of Mentally Handicapped and Very Apprehensive Individuals).
Final rept.,
P. C. Makkes, D. M. E. Vermeulen-Cranch, S. K. Thoden van Velzen, and M. de Zeeuw-van Gerven.
15 Jan 82, 18p
Text in Dutch.

Dentistry analgestic and anaesthetic procedures employed with mentally handicapped individuals and those evidencing a high degree of anxiety. Effects of oxygen-laughing gas admixtures. Use of inhalation types sedatives on persons dreading dentistry procedures. A long list of references, most of them dealing with laughing gas - oxygen application follows the report.

PB83-109611 PC **A03**/MF **A01**
Technische Hogeschool, Delft (Netherlands).
Snelheidsverdelingen in een Perfusiekamer (Flow Rate Distributions in a Perfusion Chamber),
J. A. Th. M. van den Broek. Jun 81, 33p MEAH-8
Text in Dutch.

The Baumgartner perfusion chamber is a much used device in research on the adhesion of blood platelets to the vessel walls. The aim of this work was to investigate whether any secondary flow (circulation, flow separation) occurs in the perfusion chamber during experiments with flow rates up to 3 ml/s ($Re = or < 50$). This report starts with some theoretical aspects of the flow. The major part describes the measurements. These show that the flow in a perfusion chamber without a restriction can be strongly asymmetrical depending on the flow inlet conditions and the positioning of the central rod. A piece of rubber tube was placed around the rod to introduce a restriction in the flow equivalent to the effect of a piece of vessel wall in a perfusion experiment. The cross-sectional area of the flow is approximately halved. In a small region of the flow downstream of the restriction, the measurements suggest circulatory flow. It is, however, not certain that circulation is present; the results could be caused by measuring errors. It can be concluded that there is no need to shorten the piece of vessel wall to eliminate the effect of secondary flow to the adhesion of blood platelets. The design of the perfusion chamber itself can give rise to disturbances of the flow. An improved design is suggested.

PB83-110403 PC **A03**/MF **A01**
Eastman Dental Center, Rochester, NY.
Clinical Comparison of the Effect of Daily Mouthrinsing with Stannous Fluoride and Sodium Floride upon Dental Caries, Dental Plaque, Gingivitis and Tooth Staining.
Final rept. 30 Sep 78-29 Mar 82,
Dennis H. Leverett. May 82, 33p NIDR/CR-82-09
Contract N01-DE-82417

Two groups of children, age 12-15, rinsed daily for 28 months with aqueous fluoride solutions, one group using 0.05% sodium fluoride (NaF) and the other group using 0.1% stannous fluoride (SnF2). The SnF2 group developed extrinsic stains of 3-4 times the severity of the NaF group, although the stains in the SnF2 group were quite mild and not explicitly distinguishable, even to the trained examiner. The SnF2 group demonstrated less plaque accumulation after 4 months, but the difference was not apparent at 16 and 28 months. Gingivitis was less severe in the SnF2 group at 4 months and 16 months, but not at 28 months. The increment of occlusal and bucco-lingual caries was less in the SnF2 group and the increment of proximal caries was less in the NaF group, measured over 28 months. There was no difference in total DMFS between the two groups.

PB83-111674 PC **A03**/MF **A01**
Texas Univ. Health Science Center at Houston.
Clinical Comparison on the Effect of Daily Mouthrinsing with Stannous Flouride and Sodium Fluoride upon Dental Caries, Dental Plaque, Gingivitis, and Tooth Staining.
Final rept. 30 Sep 78-30 Apr 82,
Lawrence A. Friedman. 18 May 82, 36p NIDR/CR-82/10
Contract N01-DE-82416

A three year clinical trial to compare the effects of daily rinsing with sodium fluoride and stannous fluoride has been completed. Specific parameters under investigation included dental caries, gingivitis, bacterial plaque accumulation and extrinsic tooth stain. Participation and cooperation was good. Results indicate both mouthrinses are similar in their ability to reduce dental caries, bacterial plaque and gingivitis. Stannous fluoride does have the ability to leave a greater amount of extrinsic stain on the teeth of the user.

PB83-111799 PC **A07**/MF **A01**
Raad voor Gezondheidsresearch TNO, Voorburg (Netherlands). Werkgroep Classificatie en Coderingen/Projectgroep.
Onderzoekvoorstel voor een Projectgroep Classificatie en Codering in de Gezondheidszorg (Papers from the Working Group Classification and Codings Project Group - Bureau Classification and Codings).
Feb 77, 134p
Text in Dutch.Portions of this document are not fully legible.

The report is a collection of papers which concern standardization of classifications and organizations in health care.

PB83-112706 PC **A03**/MF **A01**
National Research Council, Washington, DC.
Management of the Diarrheal Diseases at the Community Level.
Final rept.
1981, 28p
Contract AID/ta-C-1428

Community management of acute diarrheal diseases should include introduction of oral-rehydration solutions and early feeding. Currently, the WHO-recommended formula (which includes 90 meq/liter of sodium and 111 mmol/liter of glucose along with potassium and bicarbonate) is the most desirable choice. Alternative solutions, for example, using sucrose instead of glucose, with a lowered content of sodium, or without sodium or bicarbonate, may be indicated in certain situations after considering both benefits and risks. Based on still inadequately validated current concepts, continued breastfeeding of the unweaned child and early feeding of the unweaned child are desirable.

PB83-112722 PC **A03**/MF **A01**
Food and Drug Administration, Washington, DC. Bureau of Foods.
Compliance Program Report of Findings: FY 79 Total Diet Studies - Adult.
Final rept.
Sanford A. Miller. 28 Jun 82, 48p FDA/BF-82/98
See also PB82-260597.

This study was done to determine the level of residues of pesticides (including selected herbicides and fungicides), PCBs and other industrial chemicals, and selected elements in the dietary intake of an American male (15-20 years old), to determine if levels of contaminants are related on a geographical or seasonal basis; and to identify trends and compare U.S. levels found with World Health Organization or other acceptable levels.

PB83-112755 PC **A07**/MF **A01**
Texas A and M Univ., College Station.
Proceedings of the Second Engineering Control Technology Workshop, June 11-12, 1981.
Final rept.,
Harry J. Suggs, Ralph J. Vernon, Richard B. Konzen, and John T. Talty. Jun 82, 143p

Forty-five people concerned with occupational safety and health engineering control technology and representing industry, academia and government met at Texas A&M University on June 11 and 12, 1981 in the Second Engineering Control Technology workshop. After the welcome, three speakers reported on activities since the first workshop in May, 1979. Challenges were then presented to the group by five speakers covering: what corporate management expects of industrial hygiene and safety engineers; industrial hygiene and safety engineering input into new designs; interrelationships between industrial hygiene, safety, fire protection and environmental engineering; alternatives for incorporating industrial hygiene and safety engineering into engineering education; and the economics of illness/injury prevention.

PB83-112771 PC **A09**/MF **A01**
Health Care Financing Administration, Baltimore, MD. Office of Research, Demonstrations, and Statistics.
Medicare Summary: Use and Reimbursement by Person, 1976-1978.
Final rept.,
Bennett Hirsch, Herbert A. Silverman, and Allen Dobson. Aug 82, 164p HCFA/PUB-03137

This is a publication of the Health Care Financing Program Statistics series. It presents detailed statistics and analysis on the number of aged and disabled Medicare enrollees using Medicare services and their reimbursement for covered Medicare services. The report is classified by major types of Medicare services and by age, race, sex, and State of residence of Medicare enrollees age 65 and over and eligible disabled enrollees less than 65 years of age. It is the only report that provides such statistics by person.

PB83-113050 PC **A06**/MF **A01**
Nederlands Inst. voor Praeventieve Gezondheidszorg TNO, Leiden.
Jeugdgezondheidszorg in Nederland--Een Verkenning (Youth Health Care in the Netherlands--An Exploration),
W. P. Herngreen, W. J. Meijer, E. A. Schlesinger-Was, and F. J. Veenhof. Aug 81, 101p
Text in Dutch.

The purpose of the present report is to provide a basis for further study in the area of youth health care. The report indicates frameworks for a research program comprising the entire area of youth health care (chapter 6) and indicates more detailed issues and areas of research on which the Netherlands Institute for Preventive Health Care might concentrate (chapter 7). The purpose is that the visions and conclusions contained in the report be discussed with experts from the public sector as well as the practical practitioners, which will lead to a more definitive set-up. Chapter 2 elucidates the background of the project. Chapter 3 provides an outline of the structural problems within the health care sector in the Netherlands. Chapter 4 defines the term 'youth health care.' Chapter 5 gives a description of youth health care and its position within the entire health care sector in the Netherlands on the basis of the literature and the information given by experts. Chapter 6 aims at giving an outline for a program of research covering the entire area of youth health care. Preference is stated in favor of research programs in which the longitudinal character of youth health care comes to its right. This is worked out in a systematic survey of research subjects. Chapter 7 indicates preferred issues and areas of research, such as periodic health examinations, early reporting, diagnosis and screenings. Attention is, in particular, drawn to: the revised van Wiechen scheme and the Ewing test. In addition, study might be performed on the activities and functions on the supporting level.

PB83-114348 PC **A04**/MF **A01**
Utrecht Rijksuniversiteit (Netherlands). Subfaculteit Tandheelkunde.
Enkele Aspecten Betreffende Tandcaries, Restaureren, Cureren of Voorkomen (Some Aspects Regarding Dental Caries, Restoration, Cures or Prevention).
Symposium (Annual).
19 Mar 82, 72p
Text in Dutch.

This is the third subsequent program held on the occasion of Utrecht University Foundation Day (19 March). This time the agenda was 'Prevention of Dental Caries.' The program included talks by various doctors on subjects such as: 'Is a timely diagnosis of caries possible.' 'Flouride and the prevention and cure of dental caries - Theoretical Aspects,' 'The protection of pits and fissures.'

PB83-114439 PC **A12**/MF **A01**
Nederlands Inst. voor Praeventieve Gezondheidszorg TNO, Leiden.
Kosten en Financierina van de Gezondheidszora in Groningen en Drenthe, 1977 (Costs and Financing of Health Care in Groningen and Drenthe, 1977),
P. H. J. Bucking, and H. J. Frielink. Dec 81, 275p
Text in Dutch.

The costs of health care included in the study are the costs of staff and facilities in Groningen and Drenthe in 1977 and the costs of the use of facilities by residents of the two provinces. The costs of hospitals, out-patient mental health care and out-patient mentally deficient health care were taken from financial reports of the institutions, the costs of psychiatric hospitals and

institutions for the mentally deficient from publications by the Ministry of Public Health and Environmental Hygiene, and the costs of nursing homes and other institutions were established on the basis of advances made by the Central Payments Office of the Exceptional Medical Expense Insurance. The costs of social health care and public health care are partly based on annual estimates by the provincial private non-profit organizations supported by national and local governments providing medical services, respectively by the services of public health care and partly on data from the Central Statistical Office and the Ministry of Public Health and Environmental Hygiene. The costs of the use of intramural facilities by residents of Groningen and Drenthe were based on days of hospitalization and average costs per day of hospitalization. The costs of family doctors, specialists, physiotherapists, obstetricians, midwives, dentists, etc., are for those covered by public health insurance based on indemnities in the working accounts of the public health insurance funds and for those not covered by these funds on the national ratio between costs of public health insurance fund patients and patients not covered under public health insurance fund plans. Here, only costs involving residents of Groningen and Drenthe are included.

PB83-115030 PC **A11**/MF **A01**
Ministry of Public Health, Bangkok (Thailand).
Lampang Health Development Project Documentary Series. Volume I: Summary Final Report of the Lampang Health Development Project.
1981, 238p
Contracts AID/csd-3423, AID/ca-1320
See also Volume 2, PB83-115048.
Also available in set of 6 reports PC E99, PB83-115022.

The documentary series comprises six volumes. Volume I summarizes the development, evaluation, conclusions, and recommendations of the Project. This volume is divided into chapters on: Project development and area background; community health volunteers and primary health care; community health paraphysicians - Wechakorn; community health role of the provincial hospital; management, supervision, and support; accessibility and utilization of health services; cost-effectiveness of the health system; impact on the population and environment; feasibility of implementing the Lampang system's key features nationwide; and major conclusions, recommendations, and implications. A list of personnel and consultants of the Lampang Health Development Project is included.

PB83-115048 PC **A18**/MF **A01**
Ministry of Public Health, Bangkok (Thailand).
Lampang Health Development Project Documentary Series. Volume II: Development of an Integrated Rural Health Services and Primary Health Care System in Lampang, Thailand.
1981, 416p
Contracts AID/cad-3423, AID/ca-C-1320
See also Volume 1, PB83-115030, and Volume 3, PB83-115055.
Also available in set of 6 reports PC E99, PB83-115022.

Volume II describes the development of the Project, focussing on its key features. This volume is divided into monographs on: The Lampang Health Development Project - New Approaches to Rural Health Care; Developing Community Health Volunteers and Primary Health Care; Developing Community Health Paraphysicians (Wechakorn); Expanding the Community Health Role of the Provincial Hospital; Strengthening Management, Supervision, and Support for Integrated Rural Health Care; and A System of Evaluation and Management Information for Rural Health Development. A list of the personnel and consultants of the project are included in an Appendix, as are four papers entitled: Primary Health Care as a Key Strategy to Achieve Health for All by the Year 2000; The Thai Concept of Primary Health Care; An Historical Perspective of the Lampang Health Development Project; and An Open Letter to the Lampang Project Workers.

PB83-115055 PC **A15**/MF **A01**
Ministry of Public Health, Bangkok (Thailand).
Lampang Health Development Project Dcoumentary Series. Volume III: Evaluation of the Lampang Integrated Rural Health Services and Primary Health Care System.
1981, 327p
Contracts AID-cad-3423, AID/ca-C-1320
See also Volume 2, PB83-115048, and Volume 4, PB83-115063.
Also available in set of 6 reports PC E99, PB83-115022.

Volume III presents the Project evaluation, results, conclusions, and recommendations. This volume is divided into monographs entitled: Evaluating and monitoring integrated rural health services - lessons from the Lampang experience; accessibility and acceptance of rural health services in Lampang; health system and personnel performance and costs; impact on the population's health; and feasibility and affordability of implementing the Lampang system's key features nationwide - implications for the future.

PB83-115063 PC **A09**/MF **A01**
Ministry of Public Health, Bangkok (Thailand).
Lampang Health Development Project Documentary Series. Volume IV: Community Health Volunteers' Manuals,
Choomnoon Promkutkao, and Stanley Zankel. 1981, 197p
Contracts AID/cad-3423, AID/ca-C-1320
See also Volume 3, PB82-115055, and Volume 5, PB83-115071.
Also available in set of 6 reports PC E99, PB83-115022.

This volume is divided into five separate manuals. They are the: Health Post Volunteers' Manual; Health Post Volunteers' Nutrition Manual; Village Health Communicators' Manual; Village Health Communicators' Nutrition Manual; and Traditional Birth Attendants' Manual.

PB83-115071 PC **A15**/MF **A01**
Ministry of Public Health, Bangkok (Thailand).
Lampang Health Development Project Documentary Series. Volume V: Community Health Paraphysician (Wechakorn) Training in Medical Care Modules 1-13,
Choomnoon Promkutkao, and Ronald Wilson. 1981, 347p
Contracts AID/cad-3423, AID/ca-C-1320
See also Volume 5, PB83-115063, and Volume 6, PB83-115089.
Also available in set of 6 reports PC E99, PB83-115022.

This volume is divided into 13 modules. They are: Introduction to comprehensive health care; medical terminology; anatomy and physiology; medical history-taking; physical examination; laboratory examinations; formulary - essential drugs for paraphysicians; common skin diseases; eye, ear, nose, and throat problems; medical problems; pediatric problems; gynecological problems; and emergency problems.

PB83-115089 PC **A13**/MF **A01**
Ministry of Public Health, Bangkok (Thailand).
Lampang Health Development Project Documentary Series. Volume VI: Community Health Paraphysician (Wechakorn) Training in Public Health Modules 14-24,
Choomnoon Promkutkao, and Ronald Wison. 1981, 283p
Contracts AID/cad-3423, AID/ca-C-1320
See also Volume 5, PB83-115071.
Also available in set or 6 reports PC E99, PB83-115022.

This volume is divided into eleven modules. They are: Public health administration and primary health care; community health services - organization, management, and supervision; maternal and child health care; family planning; nutrition; dental health; environmental sanitation; statistics; epidemiology; communicable disease control; and health education.

6F. Environmental Biology

AD-A119 461/2 PC **A03**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Environmental Lab.
Summary of a Workshop on Plant Canopy Structure, 27-30 April 1981, Oak Ridge, Tennessee.
Final rept.,
Lee K. Balick, and Boyd A. Hutchison. Aug 82, 48p Rept no. WES/TR/EL-82-5

Canopy structure is of considerable interest in both military and civil science. The topic has strong implications with reference to crop and forest yields, ecosystem structures and functions, and surface effects on atmospheric processes. Military interests in canopy structure are generally associated with munitions effects, aerosol dispersion, target detection, and (conversely to detection) camouflage, concealment, and deception. Canopy structure relates to these military phenomena or activities through direct shielding or through its effects on rates of transport and diffusion of atmospheric materials or its interactions with electromagnetic radiation. (Author)

AD-A119 782/1 PC **A02**/MF **A01**
Air Force Occupational and Environmental Health Lab., Brooks AFB, TX.
Survey Report: Mercury Vapor Levels in Dental Treatment Rooms.
Preliminary rept. for period ending May 82,
Miriam C. Vaughn. Aug 82, 12p Rept no. OEHL-82-020EH253HGA

Three dental treatment rooms (DTRs) at Brooks AFB TX were surveyed for mercury vapor levels. These DTRs are being used by the Dental Investigation Service, USAFSAM/NGD, in a protocol to determine the relationship between the use of precapsulated dental amalgam, type of floor covering and mercury vapor levels. This preliminary survey shows mercury vapor levels in each room to be below the lowest detectable level (.001 mg/cu m). These results will serve as a baseline for the semiannual surveys to be taken over the next two years. (Author)

DE82007989 PC **A04**/MF **A01**
Lawrence Livermore National Lab., CA.
Health and Environmental Effects Document on Geothermal Energy: 1981.
D. W. Layton, L. R. Anspaugh, and K. D. O'Banion. 4 Dec 81, 67p UCRL-53232
Contract W-7405-ENG-48

Several of the important health and environmental risks associated with a reference geothermal industry that produces 21,000 MW/sub e/ for 30 y (equivalent to 20 x 10 exp 18 J) are assessed. The analyses of health effects focus on the risks associated with exposure to hydrogen sulfide, particulate sulfate, benzene, mercury, and radon in air and arsenic in water. Results indicate that emissions of hydrogen sulfide are likely to cause odor-related problems in geothermal resources areas, assuming that no pollution controls are employed. For individuals living within an 80 km radius of the geothermal resources, chronic exposure to particulate sulfate could result in between 0 to 95 premature deaths per 10 exp 18 J of electricity generated. The mean population risk of leukemia from the inhalation of benzene was calculated to be 3 x 10 exp -2 cases per 10 exp 18 J. Exposure to elemental mercury in the atmosphere could produce between 0 and 8.2 cases of tremors per 10 exp 18 J of electricity. Inhalation of radon and its short-lived daughters poses a mean population risk of 4.2 x 10 exp -1 lung cancers per 10 exp 18 J. Analysis of skin cancer risk from the ingestion of surface water contaminated with geothermally derived arsenic suggests that a dose-response model is inconsistent with data showing that arsenic is an essential element and that excessive body burdens do not appear even when arsenic reaches 100 mu g/liter in drinking water. Estimates of occupational health effects were based on rates of accidental deaths and occupational diseases in surrogate industries. According to calculations, there would be 14 accidental deaths per 10 exp 18 J of electricity and 340 cases of occupational diseases per 10 exp 18 J. The analysis of the effects of noncondensing gases on vegetation showed that ambient concentrations of hydrogen sulfide and carbon dioxide are more likely to enhance rather than inhibit the growth of plants. (ERA citation 07:043118)

DE82011301 PC **A08**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.

Annual Report for 1981 to the DOE Office of the Assistant Secretary for Environmental Protection, Safety, and Emergency Preparedness. Part 2. Ecological Sciences.
B. E. Vaughan. Feb 82, 164p PNL-4100-Pt.2
Contract AC06-76RL01830

Separate abstracts were prepared for the 38 reports for this Pacific Northwest Laboratory Annual Report for 1981 to the DOE Office of Energy Research. This part dealt with research conducted in the ecological sciences. (ERA citation 07:046022)

DE82011460 MF **A01**
New Mexico Health and Environment Dept., Santa Fe. Environmental Improvement Div.
Radiological Health Review of the Draft Environmental Impact Statement (DOE/EIS-0026-D): Waste Isolation Pilot Plant, US Department of Energy.
R. H. Neill, J. K. Channell, C. Wofsy, and M. A. Greenfield. Aug 79, 216p EEG-3
Contract AC04-78AL10752
Portions of document are illegible.
Available in microfiche only.

This review of radiological health considerations contains a number of concerns, questions and recommendations that should be addressed by the Department of Energy in the final Environmental Impact Statement (EIS). Using the assumptions contained in the Draft Environmental Impact Statement (DEIS), the EEG calculated a number of radiation doses and the results were found to be in general agreement with those presented in the DEIS. The doses resulting from the operational and long-range releases from WIPP to the general population are no more than a fraction of existing radiation doses to the public. However, there are a number of technical considerations in the assessment of radiation exposure that were not adequately evaluated in the DEIS. They are discussed in this review. A number of additional dosage estimates have been identified that need to be calculated by both DOE and EEG. As the DEIS did not contain estimates of the amounts of radioactivity to be permanently located in the repository, it was necessary to calculate these amounts. It is apparent from our analyses that additional information and evaluations will be necessary in the future if the WIPP project proceeds. Consequently, the DEIS and its review are only the beginning of the health and safety evaluations that need to be performed. The DOE stated in the DEIS that the WIPP repository should be licensed by the Nuclear Regulatory Commission (NRC). Recent developments suggest that the WIPP may not be licensed by that organization. EEG recommends that the proposed facility be subjected to the full scrutiny of health and safety considerations afforded by the licensing procedures of the NRC. (ERA citation 07:049412)

DE82013485 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor. Biological Station.
Ecology-Meteorology Workshops. Final Report.
Mar 82, 3p DOE/EV/02757-1
Contract AC02-76EV02757

Three ecology-meteorology workshops were held at the University of Michigan Biological Station in summers 1975, 1976, and 1977. The purpose of the workshops was to identify and focus attention on the common areas of research that require the cooperative efforts of ecologists and meteorologists. It was felt that these two respected groups of scientists have been quite isolated from each other, each underestimating the contribution and complexity of the other discipline. Yet the complex environments they investigate are strikingly interactive. To fully understand these relationships, it was intended to promote more communication between the two disciplines through the format of workshops in a secluded environment free from outside distractions conductive to easy communication.

DE82015296 PC **A06**/MF **A01**
EG and G, Inc., Santa Barbara, CA. Energy Measurements Group.
Potential of BLM Lands in Western Fresno and Eastern San Benito and Monterey Counties, California, as Critical Habitats for the Endangered San Joaquin Kit Fox, Vulpes Macrotis Mutica, and Blunt-Nosed Leopard Lizard, Crotaphytus Silus.
T. P. O'Farrell, P. McCue, and T. Kato. Nov 81, 113p EGG-1183-2440
Contract AC08-76NV01183
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The major objectives were to determine the presence and relative density of the San Joaquin kit fox and blunt-nosed leopard lizard on BLM lands in western Fresno and eastern San Benito and Monterey counties, California, and to determine the potential of these lands as critical habitat for these endangered species. A total of 6220 acres in the Ciervo Hills and 4000 acres near Coalinga were surveyed for both San Joaquin kit fox and blunt-nosed leopard lizards; 810 acres in the Griswold Hills were surveyed for kit fox only; and 2000 acres in the Tumey Hills were surveyed for blunt-nosed leopard lizards only. Eight line transects per mile were used to gather information on: (1) kit fox dens, scats, tracks, and remains of their prey; (2) presence of blunt-nosed leopard lizards; (3) vegetation associations; (4) density of rodent burrows on lands surveyed for leopard lizards; (5) topography; (6) evidence of human activities; (7) presence of other wildlife species; and (8) any additional scientific data related to endangered species. Night spotlight surveys were conducted in the Ciervo Hills, Griswold Hills, and on lands adjacent to Coalinga and San Ardo to document presence of kit fox, their potential prey, and other vertebrates. Of BLM land surveyed in 1981, the Coalinga Land Unit had the highest potential as critical habitat for the San Joaquin kit fox, the Ciervo Hills Land Unit was ranked second,.

DE82902544 PC **A02**/MF **A01**
Tennessee Valley Authority, Chattanooga. Office of Natural Resources.
Gallatin Steam-Electric Plant - Paddlefish Investigations. Supplemental Progress Report FY 1981.
C. M. Alexander, and R. W. Pasch. Mar 82, 9p TVA/ONR/WRF-82/1

Impingement of unusually high numbers of paddlefish on intake screens at Gallatin Steam-Electric Plant (GAF) during 316(b) demonstration sample periods (TVA 1976) caused concern about possible impact of plant operation on the Old Hickory Reservoir paddlefish population. Abundance of young-of-year (YOY) paddlefish in the reservoir could not be accurately estimated because juvenile paddlefish are not often taken by standard sampling methods. Because data were lacking to compare estimated YOY abundance with impingement mortality, the National Pollutant Discharge Elimination System (NPDES) permit for GAF required a special study of paddlefish in Old Hickory Reservoir. Efforts were begun in 1978 to propagate paddlefish for use in mark-recapture estimates of the number of YOY paddlefish present in Old Hickory Reservoir and exploitation rate for GAF. Studies conducted from October 1980 through September 1981 (FY 1981) were incomplete as of the April 28 reporting date required by the NPDES permit for GAF and are reported here as per commitment in that report, submitted earlier for compliance purposes. Results of impingement monitoring and trawling are given. Also included here, as stated in the earlier 1981 compliance report, are direction and impetus of future paddlefish studies at GAF and Old Hickory Reservoir. (ERA citation 07:044844)

N82-31831/2 PC **A02**/MF **A01**
Swedish Water and Air Pollution Research Lab., Goeteborg.
Stress in Ecosystems.
A. Jerneloev, and U. Wahlgren. Mar 81, 13p DE82-901366, IVL-B-599

A stress concept which relates to energy flows through ecosystems is suggested. The need of quantifying of responses to external pressure is pointed out. The efficiency of the systems is defined as the degree of utilization of the available energy, and these factors are used for definitions of stress. The concepts are visualized in quantities obtained from simple Lotka-Volterra type equations.

N82-31887/4 PC **A02**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Workshop on Closed System Ecology.
15 Jul 82, 19p NAS 1.26:169280, JPL-PUB-82-64, NASA-CR-169280
Workshop Held in Pasadena, Calif., 18-22 Jan. 1982.

Self maintaining laboratory scale ecological systems completely isolated from exchanges of matter with external systems were demonstrated. These research tools are discussed in terms of their anticipated value in understanding (1) global ecological material and energy balances, (2) the dynamics of stability and instability in ecosystems, (3) the effects of man-made substances and structures on ecosystems, and (4) the precise requirements for dynamic control of controlled ecology life support systems (CELSS).

PAT-APPL-6-370 019 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Dibutylorthobenzylmethoxybenzenes and Dibutylorthocinnamylmethoxybenzenes as Mosquito Larvae Growth Inhibitors.
Patent Application,
Leonard Jurd. Filed 20 Apr 82, 22p PB83-101477
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to and has among its objects the provision of novel organic compounds and the use thereof in insect control, particularly inhibition of the growth of mosquito larvae.

PB83-111583 PC **A07**/MF **A01**
Bureau of Radiological Health, Rockville, MD.
An Overview of Ultrasound: Theory, Measurement, Medical Applications, and Biological Effects.
Final rept.,
Harold F. Stewart, and Melvin E. Stratmeyer. Jul 82, 147p DHHS/PUB/FDA-82-8190, FDA/BRH-82/76

This document examines medical ultrasound in the United States. The first part of this report provides background information on characteristics and interaction of ultrasound with matter, measurement of ultrasound fields, and medical applications of ultrasound. The second part of this report emphasizes the potential biological effects of ultrasound in humans and experimental animals and the possible mechanisms for producing these effects. The potential risk to public health is evaluated and recommendations are made for the safe use of this modality. Recommendations are also made for further research to help clarify the potential biological risk associated with this rapidly growing modality.

PB83-112102 PC **A04**/MF **A01**
Colorado Div. of Wildlife, Fort Collins. Research Section.
Twin Lakes Studies: A Characterization of the Twin Lakes Fishery via Creel Census with an Evaluation of Potential Effects of Pump-Storage Power Generation,
Thomas P. Nesler. Nov 81, 58p REC-ERC-82-4

Creel census studies were conducted at Twin Lakes, Colo. from 1972 to 1979 to characterize the fishery, and to provide a basis for the evaluation of potential impacts upon the fishery resulting from the construction and operation of the Mt. Elbert Pumped-Storage Powerplant located on the lower lake. In this report, creel census data are presented for the period December 1976 to September 1979. Creel census has resulted in characterization of the Twin Lakes fishery with a precision adequate for analyses of pumped-storage effects upon the major components of the fishery. Potential powerplant impacts, such as increased mortality to rainbow trout, daily and seasonal water-level fluctuations, and shoreline turbidity may have adverse effects on the Twin Lakes shore fishery for rainbow trout. Large-scale impacts probably will be necessary to demonstrate effects upon the boat fishery and the lake trout harvest.

6H. Food

PB83-111682 PC **A03**/MF **A01**
National Research Council, Washington, DC. Advisory Board on Military Personnel Supplies.
Dehydration and Compression of Foods.
Final workshop rept.
1982, 49p ABMPS-116
Contract DAAK60-79-C-0015

This report contains an examination of the problems faced by the armed forces in attempting to obtain high quality, dehydrated compressed foods as economically as possible.

PB83-111690 PC **A04**/MF **A01**
National Research Council, Washington, DC. Advisory Board on Military Personnel Supplies.

Reconstructed Meat Technology for the Military.
Periodic rept.
1982, 52p ABMPS-124
Contract DAAK60-79-C-0015

The committee reviewed areas of the technology of restructured meats of particular interest to the military such as equipment, processes, and products; additives that influence the functional properties of restructured meats; storage stability; mechanically deboned and desinewed meats in restructured meats; and restructured marine products.

PB83-112318 PC **A03**/MF **A01**
Food and Drug Administration, Washington, DC. Bureau of Foods.
Compliance Program Report of Findings: FY 75 Pesticide Program and FY 76 Pesticides and Metals Program,
28 Apr 80, 35p
See also PB82-260605.

This is an evaluation of two Compliance Programs, FY 75 Pesticide Program and FY 76 Pesticides and Metals Program. The objectives are: To provide consumer protection by locating foods that contain unsafe levels of pesticides, to maintain surveillance over pesticides and the presence and level of PCBs in foods, and to determine background levels of metals for selected food commodities in FY 76.

PB83-851071 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Rheological Properties of Breads and Cereals. 1972-October, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for 1972-Oct 82.
Oct 82, 260p
Prepared in cooperation with the International Food Information Service, Frankfurt am Main (Germany, F. R.).

This bibliography contains citations concerning the rheological properties of breads and cereals. The effects of mixing time and additives are discussed and the rheological properties of dough as a function of water absorption and fat, sugar, and salt contents are considered. Methods and equipment for measuring viscosity and other rheological properties are also included. (Contains 265 citations fully indexed and including a title list.)

PB83-851527 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Maillard Reaction: Effects on Foods. 1972-October, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for 1972-Oct 82.
Oct 82, 187p
Prepared in cooperation with the International Food Information Service, Frankfurt am Main (Germany, F. R.).

This bibliography contains citations concerning the Mailiard reaction during the storage and handling of food products. The mechanisms of formation of flavor and aroma compounds by this reaction are discussed, and the organoleptic properties of the reaction products are considered. (Contains 184 citations fully indexed and including a title list.)

PB83-851576 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Soy Sauce: Manufacturing Processes (Including Patents). 1972-October, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for 1972-Oct 82.
Oct 82, 65p
Supersedes PB81-874661.Prepared in cooperation with the International Food Information Service, Frankfurt am Main (Germany, F. R.).

This bibliography contains citations concerning the manufacture of soy sauce. The raw materials and processing techniques are described. The most mentioned methods include enzyme hydrolysis, bacterial fermentation, and yeast fermentations. Other methods, which vary one step or another, are also considered. (This updated bibliography contains 89 citations, 24 of which are new entries to the previous edition.)

PB83-852095 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Capillary Chromatography of Foods. July, 1973-October, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jul 73-Oct 82.
Oct 82, 105p
Supersedes PB82-858341.Prepared in cooperation with the International Food Information Service, Frankfurt am Main (Germany, F. R.).

This bibliography contains citations concerning the applications of capillary chromatography (also referred to as capillary gas chromatography or glass capillary column chromatography). The analysis of foods for fatty acids, aroma compounds, flavorings, and triglycerides are discussed in the cited reports. (This updated bibliography contains 96 citations, 21 of which are new entries to the previous edition.)

6J. Industrial (Occupational) Medicine

DE82006826 PC **A05**/MF **A01**
Carnegie-Mellon Inst. of Research, Pittsburgh, PA.
Assessment of Health, Safety and Environmental Impacts of DOE Coal Conversion Process. First Technical Progress Report, 2 July 1980-31 March 1981.
J. E. Bratina, J. P. Fillo, S. W. Vance, and G. M. Wong-Chong. Oct 81, 100p DOE/ET/14746-1
Contract AC01-80ET14746

Highlights of activities completed during the quarter are summarized in this report. The management plan developed by CMIR-ERT is outlined. The technical reports Solvent Refined Coal (SRC-II) technology: Material for Environmental and Health Characterization and Water/Wastewater Management in Coal Conversion Processes are included. The former report provides insight into the technical issues to be addressed in environmental and health programs for synfuel facilities. In the latter report management alternatives are offered which comply with regulatory and economics constraints. Experience gained in allied industries is used to support the discussion. The experimental equipment and proposed operating conditions at CMIR are described and the scope of the work is discussed. The 3 major subsystems of the riser (entrained flow gasifier) PDU system are presented. The subsystems included are: (1) the solid and gas feed system; (2) the riser gasifier; and (3) the product separation system. The Phenol Decomposition Bench-Scale Reactor is also described.

DE82008603 MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Survey of Studies of Occupational Populations Exposed to Low-Level Radiation.
S. Marks. Apr 80, 20p PNL-SA-8450
Contract AC06-76RL01830
Portions of document are illegible.
Available in microfiche only.

Studies of occupational populations exposed to large doses of radiation, principally from the ingestion of radium by dial painters and inhalation of radon and its daughters by miners, have provided important information on the health effects of those radioisotopes. Studies of medical radiologists, military personnel exposed to nuclear tests, and factory workers exposed to thorium are in progress. Employees of DOE-contractor facilities and of naval shipyards are also under study. Personnel dosimetry data are generally available for the latter category of occupational populations. Reasons for conducting the studies include interest in exploring the verification at low exposure levels of results of studies of heavily exposed populations and the responsibility of the employer to maintain adequate surveillance of the health of his workers by conducting appropriate epidemiologic studies. The low level of exposure of workers in facilities where adequate personnel dosimetry records are available make it unlikely that the results of such studies can be used to provide health risk estimates in the near future. (ERA citation 07:055202)

DE82009730 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Industrial Hygiene Sampling at Rio Blanco Oil Shale Facility.
M. Gonzales, L. L. Garcia, E. A. Vigil, G. W. Royer, and M. I. Tillery. Feb 82, 28p LA-9152-MS
Contract W-7405-ENG-36
Portions of document are illegible.
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The Rio Blanco Oil Shale Company (RBOSC) facility, in its early stages of development, provided the unique opportunity to sample a Modified In-Situ (MIS) operation during the preparation phase of the first retort, during pyrolysis, and during preparation of a subsequent retort. Industrial hygiene measurements were made in the lowest (G) level (835 feet) of the mine, prior to and during the first 30 days of the Retort Zero burn. These measurements were designed to define and characterize potential inhalation exposures associated with the MIS shale oil recovery process. This information, along with bulk samples of oil shale materials and products, was provided for use in laboratory toxicological studies. Gas and vapor samples of the compounds of interest were all much below threshold limit values (TLV) both before and after retort zero ignition although slightly elevated after ignition. Airborne dust concentrations ranged from 0.1 to 2.9 mg/m exp 3 at sizes of 0.3- to 5.2- mu m mass median aerodynamic diameter and alpha quartz content ranged from 1.1 to 4.4 percent. Polyaromatic hydrocarbons were found in relatively low concentrations with the anthracene/phenanthrene mixture at the highest level of 0.6 mu g/m exp 3 . The wetness and ventilation in this mine apparently helped control airborne contaminant concentrations below their TLV values. (ERA citation 07:045792)

DE82011685 PC **A05**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Guidance for Implementing an Environmental, Safety and Health Assurance Program. Volume 5. A Model Plan for Institutional Accident Investigations.
C. A. Trauth, Jr., and A. C. Ellingson. Jan 82, 89p
SAND-81-0636-V.5
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

This is 1 of 15 documents designed to illustrate how an Environmental, Safety and Health (ES and H) Assurance Program may be implemented. The generic definition of ES and H Assurance Programs is given in a companion document entitled An Environmental, Safety and Health Assurance Program Standard. The Standard specifies that the ES and H Staff of an institution shall establish policy and practices for accident investigation, and this document provides guidance for establishing an accident investigation program which provides such policy and practices. Unlike most other approaches, the scheme presented here utilizes a self-limiting tree to minimize investigative effort, permits no-fault accidents to have occurred, and does not automatically lead to the need for corrective action. The two appendixes include a standard ES andH audit checklist for use in the accident investigation program and an institutional routine accident investigation form. (ERA citation 07:048262)

DE82012852 MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Aerosol Deposition in Human Respiratory-Tract Casts.
T. B. Martonen. Sep 81, 25p PNL-SA-9926, CONF-811167-2
Contract AC06-76RL01830
International symposium on aerosols in the mining and industrial environment, Minneapolis, MN, USA, 1 Nov 1981, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

To assess the health hazard to the human presented by airborne particulate matter in the mining and industrial work environment, information is needed concerning total dose deposition and its distribution. Data has been obtained by depositing monodisperse ammonium fluorscein aerosols in respiratory system simulators consisting of combined human replica larynx casts and single-pathway trachebronchial (TB) tue models. Since they have only two airways in each generation distal to the trachea, airflow rates and patterns could be controlled in a practical manner with rotometers. Larynx configurations correspond to inspiratory flow rates of 15, 30 and 60 lmin. The mass median aerodynamic diameters of the aerosols ranged from 3.0 mu m

to 10.6 mu m with geometric standard deviations of 1.11 to 1.16. Total larynx and TB deposition measurements could be expressed in terms of a single parameter, the particle Stokes number. Intrabronchial dose distribution results indicated relatively large tracheal losses, attributed to the laryngeal jet. Some airway bifurcations were sites of enhanced deposition. Such hot spots would indicate very high dosage to epithelial cells of workers' airways and have important implications regarding the establishment of threshold exposure values. Findings are in agreement with aerosol deposition data from replica TB casts. Inhalation exposure tests support the use of the single-pathway TB model as a suitable surrogate in studies of factors affecting aerosol behavior and deposition in the human. (ERA citation 07:044850)

PB82-220930 PC **A24/MF A01**
Occupational Safety and Health Administration, Washington, DC.
Safety and Health for Oil and Gas Well Operations: Training Course,
Banks Mitchum, and Thaeddus Twardowski. 1 Jun 82, 574p OSHA/RP-82/001

This course covers all aspects of safety and health in oil and gas well drilling operations. It includes an introduction, normal rig operations, the hoisting system, the circulating system, the rotating system, power lighting and electrical system, blowouts and blowout prevention, well service and workover, well stimulation, and health problems in the subject area. The course was designed to train OSHA compliance personnel and consultants so that they will be able to recognize hazards and recommend abatement methods when visiting industry sites.

PB83-110320 PC **A02/MF A01**
Stewart-Todd Associates, Inc., Wayne, PA.
Industrial Hygiene Report of Preliminary and Comprehensive Survey Ground Spray Application of Paraquat at Kugler Oil Company, Culbertson, Nebraska,
Industrywide study,
Alan S. Todd. 23 Sep 81, 17p IWS-130.14

Worker exposures to paraquat (1910425) were assessed at Kugler Oil Company (SIC-2869) in Culbertson, Nebraska on July 16 and 17, 1981. The company was selected as being representative of a ground spray application of paraquat in no tillage farming applications in the Midwest. The company employed 10 to 12 personnel. Personal air sampling during field spray application was conducted. Airborne concentrations of paraquat were up to 6.4 micrograms per cubic meter. The authors conclude that there was not significant potential for inhalation exposure to paraquat and the protective measures and equipment presently in use effectively minimize health risk from skin or eye contact exposure.

PB83-110338 PC **A02/MF A01**
Research Triangle Inst., Research Triangle Park, NC.
Industrial Hygiene Walk-Through Survey Report of Litton Electron Tube Division, San Carlos, California.
Industrywide study,
David Pasquini. May 81, 24p IWS-113.13

A walk through survey of worker exposure to potentially hazardous agents in the Litton Electron Tube facility in San Carlos, California is reviewed. The facility structure, design, and products are described. The process layout by building and tube type of the klystron and travelling wave tube operations is illustrated and discussed. The work force characteristics, the medical, health and safety programs, the company policies, the record keeping system, and the workman compensation programs are reviewed. The industrial hygiene procedures are described. The authors conclude that any radiation leakage detected by the monitoring program would most likely result from a power transformer or an equipment malfunction, and that very few cases of occupational dermatitis are reported.

PB83-110437 PC **A02/MF A01**
Research Triangle Inst., Research Triangle Park, NC.
Industrial Hygiene Walk-Through Survey Report of General Electric, Owensboro, Kentucky.
Industrywide study,
David Pasquini. Jun 81, 22p IWS-113.23

A walk through survey of worker exposure to potentially hazardous agents in the General Electric Facility in Owensboro, Kentucky is reviewed. The structure and products of the facility are described. The receiving tube manufacturing process is summarized. The work force numbers, shifts, and mean age is reviewed. The medical, health and safety programs, the work policy, the recordkeeping system and the worker compensation programs are discussed. The industrial hygiene practices involving ventilation, solvent storage, equipment maintenance and housekeeping are reviewed. The authors conclude that there is a very small amount of chemical exposure based on company medical surveillance data and that the ventilating systems present in the facility provide adequate worker protection.

PB83-110536 PC **A02/MF A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH.
Investigation of a Case of Dermatitis Reported by a Roof Bolter,
J. Williams. Mar 79, 8p TA-79-101-101

Skin dermatitis in a roof bolter exposed to Celtite resin cartridges was investigated by the National Institute for Occupational Safety and Health (NIOSH). After 1 month's exposure to the resin, the bolter developed poison oak type lesions on his hands, accompanied by cracked and bleeding skin. Examination showed that he was allergic to polyester resins. Thereafter, the worker wore neoprene gloves with cotton inserts and the dermatitis symptoms disappeared. NIOSH recommends that roof bolters wear gloves and goggles, be given new cotton inserts each day, and have access to portable eyewash stations.

PB83-110544 PC **A02/MF A01**
Thermo Electron Corp., Waltham, MA. Research and Development Center.
Survey for N-Nitroso Compounds at Chevrolet Warren Manufacturing Plant, Warren, Michigan.
Final rept.,
Steve Fan, and John Fajen. 21 Jun 78, 10p

N-nitroso-diethanolamine (1116547) (NDE1A) contamination in the metal working fluids used at the Chevrolet Warren manufacturing facility (SIC-3711) was investigated by the National Institute for Occupational Safety and Health (NIOSH) on December 14, 1977. Samples were taken from Norton Wheelmate 810 and General Motors C-60 fluids and analyzed by high performance liquid chromatography. At a sensitivity level of 1 microgram per milliliter, neither NDE1A nor any other N-nitroso compound was detected in any of the fluid samples. NIOSH concludes that Norton Wheelmate 810 and General Motors C-60 fluids do not pose an N-nitroso compound hazard.

PB83-110551 PC **A02/MF A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Benzyl Chloride Survey Report at Tenneco Chemicals, Inc., Fords, New Jersey,
Joel M. Cohen. 3 Nov 76, 19p

A survey was conducted at Tenneco Chemicals, Inc. (SIC-2819) in Fords, New Jersey on October 8, 1976 to determine if a more detailed industrial hygiene survey to quantify worker exposure to benzyl-chloride (100447) was justified. The facility employed 200 workers of which 154 were operating and maintenance workers. Preemployment and exit physicals were required of all employees and a complete blood test was performed every quarter. A physician and full time nurse were employed on site and the facility had a formalized safety program. The drumming of benzyl-chloride conducted at this facility involved only one worker and one supervisor. Worker and environmental air sampling during drumming detected no significant amounts of benzyl-chloride. The author concludes that, due to low employee exposure, there is no need for a more detailed study of this facility.

PB83-111112 PC **A03/MF A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Industrial Hygiene Walk-Through Survey Report of Union Carbide Corporation, Electronic Components Division, Greenville, South Carolina.
Industrywide study,
Mark Boeniger, and David Pasquini. 29 Jun 81, 28p IWS-113.20

A survey was conducted at the Electronic Components Division (SIC-3675) of the Union Carbide Corporation in Greenville, South Carolina to identify and estimate potential worker exposure to hazardous agents in the tantalum capacitor manufacturing process. The primary potential hazards were exposure to tantalum (7440257) dust and a variety of solvents, epoxies, acids, and soldering fumes. A total of 926 production workers were employed over three shifts. At the time of the survey, no serious deficiencies in the facility safety and health programs were noted. A scheduled sampling routine for both area and personal air samples was being developed. New employees received safety training and monthly safety meetings were attended by all employees. Medical services were performed by a neighborhood health care facility, visiting corporate occupational physicians, full time nurses and workers trained in first aid. The authors note that the most significant cause of occupational illness was dermatitis, but recommended increased air sampling, improved housekeeping, determination of noise levels, and review of all new trial chemicals by the health and safety department before they are approved for procurement.

PB83-111120 PC **A02/MF A01**
Research Triangle Inst., Research Triangle Park, NC.
Industrial Hygiene Walk-Through Survey Report of Corning Glass Works, Wilmington, North Carolina.
Industrywide study,
David Pasquini. Jun 81, 19p IWS-113.22

A walk through survey of worker exposure to potentially hazardous agents in the Corning Glass Work facility in Wilmington, North Carolina is reviewed. The structure and products of the facility are summarized. The thin film resistor manufacturing process is described. The work force characteristics, the medical, health, and safety programs, the company policies, the recordkeeping systems, and the workers compensation programs are discussed. The industrial hygiene practices of ventilation, equipment maintenance and operation, and waste disposal are reviewed. The authors recommend that the facility launder the chemical handling employees' work clothes, that ventilation system be installed on the silver banding machine, that air monitoring be conducted in specific areas, that a general maintenance program be adopted for the ventilation systems and that chemical spills be cleaned only by personnel trained in chemical handling.

PB83-111138 PC **A02/MF A01**
Research Triangle Inst., Research Triangle Park, NC.
Industrial Hygiene Walk-Through Survey Report of TRW-IRC, Inc., Boone, North Carolina.
Industrywide study,
David Pasquini. Jun 81, 19p IWS-113.21

A walk through industrial hygiene survey was conducted to TRW-IRC, Inc. (SIC-3676) in Boone, North Carolina on April 15, 1981 to identify worker exposure to hazardous agents in electronic resistor manufacturing operations. About 556 workers were employed at the facility. The facility had no industrial hygienist, but a doctor visited twice each week and two emergency medical technicians were present during every shift. A preemployment examination was required of all new employees, hearing and vision tests were provided for affected employees and periodic physical examinations were provided for the employees working with lead (7439921) and methylene-chloride (75092). The author notes that the State OSHA did not conduct any air sampling nor cite the facility for safety violations during its 1980 inspection, but recommends that the baghouse exhaust be analyzed to identify contaminants that may be recirculated into production area.

PB83-111146 PC **A02/MF A01**
Research Triangle Inst., Research Triangle Park, NC.
Industrial Hygiene Walk-Through Survey Report of Cornell-Dubilier Electronics, New Bedford, Massachusetts.
Industrywide study,
David Pasquini. May 81, 18p IWS-113.10

A walk through survey of worker exposure to potentially hazardous agents in the Cornell-Dubilier Electronic facility in New Bedford, Massachusetts is reviewed. The facility structure, design and products are described. The CMR mice capacitor, AC oil capacitor, and the transmitting mice capacitor process steps are reviewed. The work force characteristics, the medical, health and safety programs and the recordkeeping systems are described. The industrial hygiene practices which are followed are discussed. The author recommends that a substitute for the barrier creams

used and for the ground silica used in the durez coating operation be found, that ventilation systems in specific areas and the housekeeping procedures be evaluated, that air sampling be carried out near the zinc plating machines, and that the trichloroethylene vapor released from the temperature controlled degreaser be monitored.

PB83-111153 PC **A02/MF A01**
Thermo Electron Corp., Waltham, MA. Research and Development Center.
Survey for N-Nitroso Compounds at Bostonian Shoes, Division of Gulf and Western, Lewiston, Maine,
Final rept.,
David P. Roundbehler. 17 Jul 78, 13p
Sponsored in part by National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.

The prevalence of N-nitroso compounds at a shoe manufacturing facility was studied. Air samples, process water samples and rubber sole stock samples were taken around the facility and analyzed for N-nitrosodimethylamine (62759). At a detection limit of 0.2 micrograms per gram (microgram/g) there were no gas chromatography thermal energy analyzer (GCTEA) responsive compounds in the bulk rubber sole materials tested. At a detection limit of 0.91 microgram/g there were no GCTEA responsive compounds in any of the air samples. At a detection limit of 0.001 microgram/g the 2 samples of leather soak water contained 9.6 and 4.3 parts per billion of N-nitrosodimethylamine. The authors conclude that these levels of N-nitrosodimethylamine are comparable to what is usually found in bacon and probably are of no real concern.

PB83-111161 PC **A04/MF A01**
JRB Associates, Inc., McLean, VA.
Safety Information Profile Use and Hazards of Flammable Solids in Industry,
Mary Hamrick, and George W. Pearson. Jun 81, 56p NIOSH-210-80-0042
Contract PHS-NIOSH-210-80-0042

Information on the use and hazards of flammable solids in industry is reviewed. The materials under question and the industries associated with these materials are discussed. Causes, prevention, and control of industrial fires and explosions involving flammable solids are reviewed. Accident factors and the population at risk are described. Existing codes and regulations are summarized. The authors recommend that additional data be collected to study the effectiveness of the current standards.

PB83-111179 PC **A04/MF A01**
New York City Dept. of Health.
Case Comparison Study of Parental Employment and Fetal Outcome.
Final rept. May-Feb 81,
21 Feb 82, 66p NIOSH-210-81-5004
Contract PHS-NIOSH-210-81-5004
Prepared in cooperation with Medical and Health Research Association of New York City, Inc.

A study of the association of parental employment to fetal outcome is reviewed. The justification of New York City as a choice of location for the study is discussed. The birth and death recordkeeping procedures followed by New York City's Department of Health are summarized. A previous similar study performed in New York City is related. The staffing, sampling plan and information gathering procedures in the present study are reviewed. The authors recommend additional studies be made of codes tailored to the types of past and current responses listed on certificates and on the current magnitude of congenial malformation in new born infants.

PB83-111187 PC **A02/MF A01**
Research Triangle Inst., Research Triangle Park, NC.
Industrial Hygiene Walk-Through Survey Report of Dionics, Inc., Westbury, New York.
Industrywide study,
David Pasquini. Jun 81, 20p IWS-113.18

A walk through industrial survey was conducted at Dionics, Inc. (SIC-3674) in Westbury, New York on March 6, 1981 to identify worker exposure to hazardous agents in the electronic semiconductor for manufacturing process. About 70 workers were employed at the facility, which had neither an industrial hygienist nor an on call physician. Employees were trained in safe handling of the chemicals and were encouraged to use personal protective equipment. The author reports a low exposure to chemicals, a high background noise levels due to ventilation blowers, and eyestrain due to improper focusing of microscopes and recommends better communication between this industry and safety groups, provision of spill control kits in the chemical storage/water chemical disposal area and that OSHA develop standards for this industry pertaining to ventilation control and chemical handling.

PB83-111195 PC **A02/MF A01**
Research Triangle Inst., Research Triangle Park, NC.
Industrial Hygiene Walk-Through Survey Report of RCA, Somerville, New Jersey.
Industrywide study,
David Pasquini. Jun 81, 17p IWS-113.19

A walk through industrial hygiene survey was conducted at RCA (SIC-3674) in Somerville, New Jersey on March 5, 1981 to examine worker exposure to potentially hazardous agents used in bipolar and complementary metal oxide semiconductor technology. No serious deficiencies were noted in the safety and health program for the 560 employees at the facility. The occupational environment appeared to be well controlled and free from hazardous chemical and physical agents. Safety training programs and personal protective equipment were provided by the company. Laminar flow rooms, laminar flow work stations and clean rooms were used throughout the processing areas. The author recommends that human engineering be used to relieve ergonomic stress involved in manual or eye work and that a medical surveillance program be developed for the facility.

PB83-111203 PC **A02/MF A01**
Stewart-Todd Associates, Inc., Wayne, PA.
Industrial Hygiene Report Preliminary and Comprehensive Survey of Trico Farm Services, Incorporated, Ground Applicator of Paraquat, Oxford, Nebraska.
Industrywide study,
Alan S. Todd. 24 Sep 81, 25p IWS-130.12

Worker exposures to paraquat (1910425) were assessed at Trico Farm Services, Incorporated (SIC-2869) in Oxford, Nebraska on July 13 and 14, 1981. The company was selected as being representative of a large ground applicator for paraquat for weed control in no tillage farming practices in the central U.S. grain belt area. The company employed 16 personnel. Personal air sampling during spray application operations was conducted. The mean exposure for an 8 hour day was approximately 10 micrograms of paraquat per cubic meter. The authors conclude that the measurable exposures meet the current occupational guidelines even under 16 hour work day conditions. Eight hour time weighted averages are well below the threshold limit value. They recommend the use of protective clothing.

PB83-111211 PC **A02/MF A01**
Research Triangle Inst., Research Triangle Park, NC.
Industrial Hygiene Walk-Through Survey Report of Intel Corporation, Santa Clara, California.
Industrywide study,
David Pasquini. Jul 81, 23p IWS-113.17

A walk through industrial hygiene survey was conducted at Intel Corporation (SIC-3674) in South Clara, California on April 27, 1981 to examine worker exposure to potentially hazardous agents used in bipolar and metal oxide semiconductor technology. No serious deficiencies in the safety and health program covering the approximately 400 employees were found. An adequate ventilation system was in use at the facility. The facility had a safety committee, an industrial hygienist, two on call physicians, a registered nurse, and an emergency response team. Preemployment and annual physical examinations were provided for all employees. h area and personal air sampling is conducted regularly. The 1980 injury and illness rate for this facility was 2.3 per 100 workers. The author notes that the major cause of work related fatalities is electrocution during maintenance operations on the high power process units and concludes that the health and safety programs at this facility is exemplary.

PB83-111302 PC **A03/MF A01**
Bureau of Radiological Health, Rockville, MD.
Concepts and Approaches for Minimizing Excessive Exposure to Electromagnetic Radiation from RF Sealers.
Final rept.,
Paul S. Ruggera, and Daniel H. Schaubert. Jul 82, 37p DHHS/PUB/FDA-82-8192

Radiofrequency (rf) dielectric plastic sealers are used to bond together or emboss plastic materials. During the process, operators of the sealers can be exposed to high levels of radiofrequency radiation. This report addresses means by which an operator's exposure can be reduced and discusses some of the various approaches taken by both users and manufacturers of rf sealers to reduce that exposure.

PB83-113134 PC **A03/MF A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH.
Part of the Human Condition - Health and Safety Hazards in the Workplace.
Jul 78, 31p DHEW/PUB/NIOSH-78-137

The NIOSH program for research and prevention of job related illness and injury is described. A brief history of occupational risks and the development of United States safety legislation are provided. Data gathering efforts, including industry wide studies, a national occupational hazard survey, and NIOSH research initiatives, are reviewed. Other NIOSH activities, including information dissemination; manpower training; and special projects concerned with occupational cancer, nonmalignant respiratory disease, women in the workplace, new energy technology, deep sea diving, control technology, and safety, are cited. Unresolved issues, such as the need to regulate occupational and environmental exposures on an industry wide basis and to study the long term implications of new industrial facilities, are discussed.

PB83-113191 PC **A04/MF A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg.
Development of LIFTEST: A Dynamic Technique to Assess the Individual Capability to Lift Material,
K. H. E. Kroemer. 26 Feb 82, 71p NIOSH-210-79-0041
Contract PHS-NIOSH-210-79-0041

A dynamic method to test a person's lifting capacity, as opposed to static testing, is discussed. Previous methods to assess lifting capacities are reviewed. Equipment and techniques for dynamic testing are described. The experiments performed with present techniques are discussed. The authors conclude that the reliability of the test is as good or better as the reliabilities reported for static strength tests and that the maximum weights that subjects were willing to lift are similar to the results reported by previous experimenters. The authors recommend that the application of this test in the industrial environment be assessed.

PB83-113241 PC **A04/MF A01**
Commissie voor Arbeidsgeneeskundig Onderzoek TNO, The Hague (Netherlands).
Aanbevelingen voor Audiometrisch Onderzoek bij een Gehoorbeschermingsprogramma (Recommendations for Audiometric Examination in Connection with Hearing Protection Program),
J. H. Ettema, G. Broekema, J. A. M. Blok, S. D. Bos, and H. J. Bruggink. c1981, 55p
Text in Dutch.

Dutch authorities preparing measures to limit occupational noise. An equivalent occupational noise level of 80 dB (A) is referred to as safe exposition from point of view of hearing impairment. It is emphasized that occupational noise may not only cause hearing impairment but that other negative effects may also occur, such as annoyance, reduction of audibility of signals, reduction of intelligibility of speech. There are also indications of negative influence through noise on physical health. The 80 dB (A) limit has only relation to safety of hearing. Above 80 dB (A), hearing protection programs should be carried out to prevent hearing impairment in workers. At levels of 95 dB (A) or above, work should only take place subject to permission from Labor Inspection Authorities, and workers should be obligated to wear hearing protectors.

PB83-113266 PC **A05/MF A01**
Commissie voor Arbeidsgeneeskundig Onderzoek TNO, The Hague (Netherlands).

Reintegratie in het Bedrijf van Myocardinfarctpatienten (Reintegration in Industry of Myocardial Infarction Patients),
J. P. M. Diederiks. 1980, 92p
Text in Dutch.

Of the group of men who have had heart infarct, 28% return to full-time employment and 22% to part-time employment, i.e. half of this group does not return to work due to death, retirement or inability to work. The 'overall' percentage of survivors resuming work is 65%, 36% to full-time employment and 29% to part-time employment. Complete resumption of work usually takes place via part-time resumption. Most of the patients resuming work do so within 6 months of the myocardial infarction. Within this period, 50% of the survivors have resumed work, i.e. well over 75% of the group eventually resuming work.

PB83-113381 PC **A05**/MF **A01**
Maryland Univ., Baltimore. School of Medicine.
Control of Blood Pressure at the Workplace.
Final rept. 1978-82,
Mary Sexton, Matthew Tayback, and Robert McCarter. Oct 82, 97p NIH/PUB-83-2012
Contract N01-HV-82912

The University of Maryland and the Maryland State employees in Baltimore participated in a National Heart, Lung, and Blood Institute contract to assess high blood pressure control methods on employee blood pressure control rates, absenteeism, and program costs. Employees in the Baltimore Street Complex in Baltimore participated in the program and substantially reduced their hypertension by treatment in the community and at the workplace.

PB83-113399 PC **A10**/MF **A01**
Michigan Univ., Ann Arbor.
Hypertension Control in the Work Setting: The University of Michigan - Ford Motor Company Demonstration Program.
Final rept. Jan 77-Jun 82,
John C. Erfurt, and Andrea Foote. Oct 82, 203p NIH-83-2013
Contract N01-HV-8-2913

The University of Michigan and the Ford Motor Company participated in a National Heart, Lung, and Blood Institute contract to assess various levels of high blood pressure control methods on employee blood pressure control rates, absenteeism, and program costs. Four different plant sites, one of which was a control, in the Michigan area were used for this demonstration project. Study results showed that effective blood pressure control rates were achieved by those employees remaining in all of the various treatment programs versus those employees in the control group. In addition, absenteeism rates for hypertensive employees under control approached, and in some cases, equaled those of normotensives. Program costs trends indicated that these blood pressure control programs are cost effective although additional long-range data are necessary to actually substantiate this claim.

PB83-113423 PC **A04**/MF **A01**
JRB Associates, Inc., McLean, VA.
Draft Safety Information Profile Personal Protective Equipment Usage in Industry,
Jefferey Chapman, and George W. Pearson. Jun 81, 54p
Contract PHS-NIOSH-210-80-0042

The safety of personal protection equipment used in industry is reviewed. Types and uses of head, face and eye, hand, foot and whole body protection equipment are discussed. The potential hazards associated with poor maintenance or improper use of protection equipment is discussed. The numbers and percent of different types of facilities that required personal protective devices are listed. The accident statistics in which these devices may have been a factor are presented. The existing codes and regulations for personal protective equipment usage are presented. The authors recommend that further study be undertaken on the lack of or improper usage of protection devices, and on the performance of existing safety equipment.

PB83-113977 PC **A02**/MF **A01**
SRI International, Menlo Park, CA.
Quick Response Evaluation of Energy Related Occupational Safety and Health Programs. Task Order 1: Mortality Study of 50 Workers Exposed to Coal Liquefaction Processes at a Union Carbide Plant, Institute, West Virginia.
Nov 77, 11p NIOSH-210-77-0031
Contract PHS-NIOSH-210-77-0031

The vital status of a cohort of 50 Union Carbide employees who had been exposed to high boiling oils containing polycyclic hydrocarbons, coal tar, and pitch was studied. At the time of an initial study, 50 employees out of a total work force of 359 had lesions of some kind. Their status was redetermined 17 years later. Out of 10 workers with diagnosed skin cancer, two had died from noncancerous causes, two had retired (one was ill with lung cancer), five were still working, and one was lost to follow up. Those 40 subjects diagnosed as having precancerous skin lesions were distributed as follows: three had died from noncancerous causes, 13 had retired, 23 were still working, and one retiree was hospitalized with Parkinson's disease and cancer of the prostate. The authors conclude that it is possible that some of the workers who had not developed skin lesions at that time may have developed more serious organ cancers at a later date after the surveillance program was discontinued. Also, if retired workers were also included, more sensitivity could be achieved and selection bias could be controlled. Further sensitivity could be gained by increasing the sample size to include similarly exposed workers from other facilities where this process was operative during the same time period.

PB83-114850 PC **A06**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Feasibility Study of a Portable Mass Spectrometer for Industrial Hygiene Field Use.
Final rept.,
Joseph M. Conley, Rodney A. Britten, Charles E. Giffin, Vilhelm J. Jahnsen, and Ablert D. Tomassian. 31 Jul 81, 120p
Sponsored in part by National Inst. for Occupational Safety and Health, Cincinnati, OH.

The feasibility and design requirements for the development of a portable mass spectrometer for industrial hygiene field use are reviewed. A set of design goals specifying analysis time, size, weight, operating time, transportability, mass range, resolution, limit of detection, control and data capability, and environmental requirements is summarized. Existing components and systems are evaluated in light of the requirements for portability and use under field conditions. Equipment under development, particularly the electro-optical ion detector, is evaluated. The relative rankings of mass analyzers, ionization sources, microprocessor families and displays are summarized. A gas chromatograph mass spectrometer system, a minimum separation system, and a state of the art system are described. The three systems are ranked according to performance, feasibility, time and cost of development, and final cost of production.

PB83-851840 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Occupational Diseases: Byssinosis. 1975-October, 1982 (Citations from World Textile Abstracts).
Rept. for 1975-Oct 82.
Oct 82, 82p
Supersedes PB82-856840.Prepared in cooperation with Shirley Inst., Manchester (England).

This bibliography contains citations concerning the epidemiology, symptoms, diagnosis, and prevelance of byssinosis in the textile industry. The respiratory hazards associated with cotton dust exposure are discussed, and OSHA cotton dust standards are considered. Chemical and microbial studies of cotton dust are also considered. (This updated bibliography contains 118 citations, 25 of which are new entries to the previous edition.)

PB83-852418 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Preventive Medicine: Hazardous Materials Exposure and Public Health. 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Oct 82.
Oct 82, 270p
Supersedes PB82-859216.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography covers medical criteria, measures, and procedures for preventing or protecting human populations from health hazards or risks due to casual, therapeutic, or occupational exposure to hazardous materials and toxic substances in natural, medical, and industrial environments. The energy and health care industries are emphasized. (This updated bibliography contains 260 citations, 77 of which are new entries to the previous edition.)

6K. Life Support

DE82902288 MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Development and Testing of a Cooling System and Possible Combination with a Breathing Protection Apparatus, Principally for Application in Mine Rescue and Recovery Operations Below Ground.
P. Engel, G. Hildebrandt, C. D. Hinz, F. J. Kock, and W. Lange. May 80, 162p BMFT-FB-HA-81-010
In German.Portions of document are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

1. Present status of research: Based on experience gained in space flights especially in the USA and the USSR research is under way to develop personal breathing protection- and cooling systems for industrial application. Conditions for specific application so far have only led to the use of cooling vests for working areas with high temperatures. Because of its alround heat and breathing protection the developed cooling suit allows rescue work to be performed under very unfavourable climatic conditions. 2. Reason for research: Presently personal protection equipment for mine rescue personnel only permits relatively short rescue operations in unfavourable climatic conditions. To increase possible success of such rescue and recovery attempts personal protection equipment is needed which creates more human conditions for long operation times. 3. Method: Working procedure - and environmental conditions-simulation by means of ergometer in climatic chambers and training areas at the mine rescue station. Recorded tests of medical parameters and questioning of the apparatus wearers. 4. Result: Cooling of the whole body combined with a breathing protection apparatus permits heavy work for relatively long period under unfavourable environmental conditions (high temperature and humidity). The time limiting factor is the humidity in the environmental sphere. At 70 exp 0 C and relative humidity of 80 to 100 percent operation times of 90 minutes are obtained until the physiological tolerance limit is reached. As to the biomechanical characteristics, the developed object is almost equivalent to the present mine rescue suits. 5. Conclusions: Outfitting the mine rescue teams with the developed object would increase the operational possibilities extensively. Apparatus modifications generally can contribute to achieve more human conditions at places of work with high temperatures. (ERA citation 07:042251)

6L. Medical and Hospital Equipment

PAT-APPL-6-394 945 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Metallic Aid in Fitting Voice Prosthesis.
Patent Application,
Evangeline Cantu. Filed 2 Jul 82, 15p AD-D009 700/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A metallic insert for use in radiographically fitting a voice prosthesis to a post-laryngectomy patient is described which comprises an elongate, generally cylindrically shaped cast metal member sized to fit snugly within the housing of a dummy prosthesis whereby the fit of the prosthesis can be accurately assessed radiographically in minimum time and with optimal fit to the individual patient. (Author)

PATENT-4 331 422 Not available NTIS
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Acoustic Tooth Cleaner.
Patent,
J. S. Heyman. Filed 14 Aug 80, patented 25 May 82, 5p N82-29862/1, PAT-APPL-6-178 193
Supersedes PAT-APPL-6-178 193, N81-12734 (19 - 03, p 0392).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

An acoustic oral hygiene unit is described that uses acoustic energy to oscillate mild abrasive particles in a water suspension which is then directed in a low pressure stream onto the teeth. The oscillating abrasives scrub the teeth clean removing food particles, plaque, calculous, and other foreign material from tooth surfaces, interproximal areas, and tooth-gingiva interface more effectively than any previous technique. The relatively low power output and the basic design makes the invention safe and convenient for everyday use in the home without special training. This invention replaces all former means of home dental prophylaxis, and requires no augmentation to fulfill all requirements for daily oral hygienic care.

PB83-109942 PC **A05**/MF **A01**
Mayo Foundation, Rochester, MN.
Blood Compatibility of Circulatory Assist Devices.
Annual rept. 1 Apr 81-31 Mar 82,
Paul Didisheim, Mrinal K. Dewanjee, David N. Fass, Craig S. Frisk, and Michael P. Kaye. 15 Apr 82, 85p
NIH-N01-HV-92915
Contract N01-HV-92915
See also PB82-129552.

This integrated approach undertaken to develop methods to predict the thrombogenicity of implanted vascular prostheses consists of (1) physical characterization of biomaterials under study; (2) assessment of cells, Willebrand factor, and total protein on these materials following exposure to native or heparinized blood in a flow chamber at controlled surface shear rate; (3) implantation of materials as patches in the aorta and pulmonary artery of foxhounds and miniature pigs, followed by 111Indium-labeled platelet survival and biodistribution, and (4) pathologic estimation of implant-induced changes and biodistribution of labeled platelets at autopsy. Woven Dacron, Gore-Tex (expanded PTFE) Vascular Graft, Teflon Felt, and two NHLBI reference materials: silica-free polydimethylsiloxane (PDMS) and low-density polyethylene (LDPE) were evaluated. Platelet deposition on materials in the chamber was quantitated by a new 111Indium-labeling method.

PB83-109967 PC **A06**/MF **A01**
Gulf and Western Applied Science Labs., Waltham, MA.
Continued Studies of Ion Beam Deposited Carbon as a Blood Compatible Material.
Final rept. 1 Dec 77-31 Mar 79,
S. Aisenberg, and M. Stein. Jul 82, 118p ASL-P-933-F
Contract N01-HV-3-2919
See also PB-261069.

Ion Beam Deposited (IBD) Carbon films were deposited on various substrates in order to evaluate their blood-compatibility as well as physical and chemical properties. Test results confirmed the blood compatible aspects, and the physical and chemical factors previously observed. The IBD equipment was improved in order to permit faster deposition of larger area films with improved purity and consistency. The film adhesion was improved and made more consistent. The barrier properties of our IBD carbon may turn out to be extremely important for blood compatibility. Test procedures were therefore implemented to measure the barrier properties. The major factors important for blood compatibility are proposed to include: carbon film purity, barrier properties to protect blood and polymer from each other, adhesion, flex resistance, and the surface properties, particularly the chemical inertness of carbon. It also appears that IBD carbon is quite resistant to fluid flow erosion.

PB83-111815 PC **A04**/MF **A01**
Medisch-Fysisch Inst. TNO, Utrecht (Netherlands).
Pacemaker Interferentie Meetopstelling (System for Measuring Pacemaker Interference),
Chr. van Nimwegen, J. Boter, and G. E. P. M. van Venrooij. Jan 81, 55p R-1981-1
Text in Dutch.

As a result of a growing number of questions from users of pacemakers and from suppliers as well as from users of potential sources of interference, research was conducted on problems of interference in pacemakers. A number of sources of interference (high power transmitters, therapeutic and dental apparatus) represent a potential hazard for people with pacemakers, while others (microwaves, weapon detectors, touch switches, even electrical household appliances) could also have an impact. Available literature on sources of interference, the measures which can be taken to counteract this interference, and methods to measure the interference is reviewed. A system of measuring, which makes it possible, following a single measuring of a suspected source of interference, to test the impact on all kinds of pacemakers in a laboratory setting is described. The results of an evaluation of this system as well as a number of suggestions for further research are also provided. For those readers who are not well acquainted with the medico-technical terminology, the table of contents is followed by an explanatory list of medico-technical terms. A very detailed bibliography is included.

PB83-113274 PC **A11**/MF **A01**
Office of Technology Assessment, Washington, DC.
Strategies for Medical Technology Assessment.
Sep 82, 230p OTA-H-181

This report analyses the present system of identifying and testing medical technologies and of synthesizing and disseminating assessment information. The report focuses on the flow of information that is central to an efficient assessment system. Methods for testing technologies and for synthesizing information are explored, and a compendium of data and bibliographic sources are included. The report also describes the innovation process for medical technologies, the effects that Federal policies have on that process, and the needs those policies generate for technology assessment information. It critiques the current system of assessment and provides policy options, both legislative and oversight, for Congress to improve the system.

PB83-851535 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cardiac Monitors: Design and Applications. June, 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 175p
Supersedes PB80-855273.

This bibliography contains citations concerning cardiac output monitoring, including stress and cardiovascular disease effects. The safety and efficacy of the monitors are considered, and technical and physiological studies are discussed. (This updated bibliography contains 139 citations, 46 of which are new entries to the previous edition.)

PB83-851543 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cardiac Monitors: Design and Applications. June, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 100p
Supersedes PB80-855265.

This bibliography contains citations concerning cardiac output monitoring, including stress and cardiovascular disease effects. Monitoring devices designed and applied to intensive care units, and studies on experimental stress onset are discussed. Devices reported upon include non-invasive or contactless types. (This updated bibliography contains 84 citations, 21 of which are new entries to the previous edition.)

PB83-851758 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cardiac Pacemakers. 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Oct 82.
Oct 82, 148p
Supersedes PB82-859950.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning the 'state of the art' of cardiac pacemakers, protection against shock and acceleration, the hazards of electric and magnetic fields, and the importance of reliability and therapeutic efficiency are noted. Also included are discussions of fixed frequency and demand pacemakers. Energy sources and design are included, and patents are noted. (This updated bibliography contains 157 citations, 53 of which are new entries to the previous edition.)

PB83-851998 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Textiles With Surgical Applications. 1975-October, 1982 (Citations from World Textile Abstracts).
Rept. for 1975-Oct 82.
Oct 82, 51p
Supersedes PB82-857822.Prepared in cooperation with Shirley Inst., Manchester (England).

This bibliography contains citations concerning the manufacture of woven and nonwoven textiles with surgical applications. The manufacture of suture material, the chemical composition of bioabsorbable coatings, and the packaging of sutures are detailed. Also mentioned is the manufacture of surgical dressings, gowns, towels, drapes, and masks. Methods of sterilization are also considered. (This updated bibliography contains 70 citations, 10 of which are new entries to the previous edition.)

6O. Pharmacology

AD-A119 425/7 PC **A02**/MF **A01**
Louisiana State Univ. Medical Center, New Orleans.
The Role of Limited Proteolysis of Thyrotropin-Releasing Hormone in Thermoregulation.
Final rept.,
Chandan Prasad. 1982, 16p
Contract N00014-80-C-0416

Cyclo (His-Pro) is a biologicly active cyclic dipeptide derived from thyrotropin-releasing hormone by its limited proteolysis. We have developed a specific radioimmunoassay for this cyclic peptide and shown its presence throughout rat and monkey brains. The normal rat brain concentration of cyclo (His-Pro) ranged from 35-61 pmols/brain. The elution profiles of rat brain cyclo (His-Pro)-like immunoreactivity and synthetic radioactive cycly (His-Pro) following gel filtration, ion-exchange chromatography and high pressure liquid chromatography were similar. An analysis of the regional distribution of cyclo (His-Pro) and TRH in rat and monkey brains exhibited no apparent precursor-product relationship. Studies on the neuroanatomic sites for the thermoregulatory effects of cyclo (His-Pro) suggested that the neural loci responsible for cyclo (His-Pro)-induced hypothermia resides within POA/AHA. The endogenous levels of brain cyclo (His-Pro) were elevated when rats were made either hypothyroid by surgical thyroidectomy or forced to drink alcohol for six weeks. These studies demonstrate that cyclo (His-Pro) is present throughout the central nervous system in physiologically relevant concentrations which can be modified by appropriate physiological and pharamacological manipulations. These data in conjunction with earlier reports of multiple biological activities of exogenous cyclo (His-Pro), suggest that endogenous cyclo (His-Pro) is a biological active peptide and it may plan a neurotransmitter or neuromodulator role in the central nervous system. (Author)

AD-A119 430/7 Not available NTIS
Defence Research Establishment Suffield, Ralston (Alberta).
BaCl2-Induced Contractions in the Guinea Pig Ileum Longitudinal Muscle: Role of Presynaptic Release of Neurotransmitters and Ca(2+) Translocation in the Postsynaptic Membrane,
John G. Clement. 30 May 80, 8p Rept no. DRES-TP-523
Abstract in French.
Availability: Pub. in Canadian Jnl. of Physiology and Pharmacology, v59 n6 p541-547 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 432/3 Not available NTIS
Defence Research Establishment Suffield, Ralston (Alberta).
Respiratory Depression Produced by Diazepam in Cats: Effect of Anaesthesia,
M. J. Lee, and J. G. Clement. 9 Jul 80, 5p Rept no. DRES-287
Availability: Pub. in Archives Internationales de Pharmacodynamie et de Therapie, v248 n2 p289-293 Dec 80 (No copies furnished by DTIC/NTIS).

No abstract available.

DE82014682 MF **A01**
Syracuse Research Corp., NY. Life and Environmental Sciences Div.
Disposition and Metabolism of Benzo(F)Quinoline.
1982, 44p DOE/EV/10418-1
Contract AC02-80EV10418
Available in microfiche only.

5,6-(exp 14 C) Benzoquinoline (BQ) administered orally as a single dose was very rapidly absorbed in the rat; the extent of absorption, however, was not determined. exp 14 C-derived radioactivity appeared to be extensively distributed in all the tissues studied, albeit at levels which represented minute fractions of the administered dose. None of the tissue studies appeared to accumulate significant levels of exp 14 C-BQ-derived radioactivity although the level of radioactivity in the adrenals at the termination of the experiment (168 h) suggested a slight accumulating potential for this organ. The diarrhea encountered in the elimination studies precluded a meaningful analysis of the data on elimination. HPLC analysis of the plasma from rats dosed with radioactive BQ revealed that metabolites appear in plasma starting a short time after administration of BQ and remain in detectable but progressively decreasing amounts for 24 hours. Analysis of urine collected over 48 hours post dosing reveals that 30 to 35% of radioactivity is extractable as free metabolites. The kinetics of endogenous hepatic DNA, RNA or protein adducts with exp 14 C-BQ derivatives were studied during a course of 96 hours following a single oral dose (20 mg/kg) of exp 14 C-BQ in rats. Peak adduct formation appeared at the same time in all three macromolecules although the highest level of adducts was observed in DNA. The data suggest DNA to be a target macromolecule for BQ and/or its derivatives in vivo.

6P. Physiology

AD-A119 426/5 PC **A14/MF A01**
Haskins Labs., Inc., New Haven, CT.
Status Report on Speech Research, 1 April-30 June 1982.
1982, 312p Rept no. SR-70(1982)
Grants PHS-HD-01994, PHS-HD-16591
Sponsored in part by Grants PHS-N01-HD-1-2420, PHS-RR-05596, NSF-PRF80-06144, NSF-BNS81-11470, PHS-NS13870, PHS-NS13617 and PHS-NS18010.

Contents: Exploring the functional significance of physiological tremor: A biospectroscopic approach; Differences between experienced and inexperienced listeners to deaf speech; A language-oriented view of reading and its disabilities; Phonetic factors in letter detection: A reevaluation; Categorical perception; Issues, methods, findings; Short-term recall by deaf signers of American Sign Language: Implications of encoding strategy for order recall; A common basis for auditory sensory storage in perception and immediate memory; Phonological awareness and verbal short-term memory: Can they presage early reading problems; Initiation versus execution time during manual and oral counting by stutterers; Trading relations in the perception of speech by five-year-old children; The role of the strap muscles in pitch lowering; Phonetic validation of distinctive features: A test case in French; On consonants and syllable boundaries; and Vowel information in postvocalic frictions.

AD-A119 436/4 PC **A04/MF A01**
Nutrition Foundation, Inc., New York.
The Effects of Cereals and Legumes on Iron Availability.
Final rept. Aug 81-Aug 82,
Thomas H. Bothwell, Fergus M. Clydesdale, James D. Cook, Peter R. Dallman, and Leif Hallberg. Jun 82, 56p
Grant DAMD17-81-G-9491

At the invitation of the INACG Secretariat, a task force of specialists from various fields met with representatives of the federal government, academia and industry to review recent research findings on the effects of cereals and legumes on iron availability. The report deals almost exclusively with human studies as it has been difficult to make extrapolations from iron absorption experiments in animals to man. (Author)

PB83-109934 PC **A07/MF A01**
Thermo Electron Corp., Waltham, MA.
Research and Development: Systems for Transmitting Energy Through Intact Skin.
Annual rept. Apr 81-Mar 82,
C. Sherman, B. Daly, K. Dasse, W. Clay, and M. Szycher. Apr 82, 131p TE4285-264-82, NIH-N01-HV-0-2903-2
Contract N01-HV-0-2903

This report covers the work performed between April 1, 1981, and March 31, 1982. In vivo and in vitro evaluations of the prototype transcutaneous transformer were completed. Based on the results, a second generation transformer was developed and in vivo testing was begun.

6R. Radiobiology

AD-A119 429/9 Not available NTIS
Defence Research Establishment Ottawa (Ontario).
Dosimetry for a Study of Effects of 2.45-GHz Microwaves on Mouse Testis,
A. B. Cairnie, D. A. Hill, and H. M. Assenheim. 20 Jun 80, 12p Rept no. DREO-834
Availability: Pub. in Bioelectromagnetics, v1 p325-336 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 431/5 Not available NTIS
Defence Research Establishment Ottawa (Ontario).
Cytological Studies in Mouse Testis Irradiated with 2.45-GHz Continuous-Wave Microwaves,
A. B. Cairnie, and R. K. Harding. 6 May 80, 9p Rept no. DREO-832
Availability: Pub. in Radiation Research, v87 p100-108 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

DE82008583 PC **A02/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Practical Quantitative Measures of ALARA.
R. L. Kathren, and H. V. Larson. Jun 82, 6p PNL-SA-9774, CONF-820613-7
Contract AC06-76RL01830
International symposium of the Society for Radiological Protection, Inverness, UK, 6 Jun 1982.

Twenty specific quantitative measures to assist in evaluating the effectiveness of as low as reasonably achievable (ALARA) programs are described along with their applicability, practicality, advantages, disadvantages, and potential for misinterpretation or dortion. Although no single index or combination of indices is suitable for all facilities, generally, these five: (1) mean individual dose equivalent (MIDE) to the total body from penetrating radiations; (2) statistical distribution of MIDE to the whole body from penetrating radiations; (3) cumulative penetrating whole body dose equivalent; (4) MIDE evaluated by job classification; and (5) MIDE evaluated by work location-apply to most programs. Evaluation of other programs may require other specific dose equivalent based indices, including extremity exposure data, cumulative dose equivalent to organs or to the general population, and nonpenetrating radiation dose equivalents. Certain nondose equivalent indices, such as the size of the radiation or contamination area, may also be used; an airborne activity index based on air concentration, room volume, and radiotoxicity is developed for application in some ALARA programs. (ERA citation 07:048215)

DE82013447 MF **A01**
Oak Ridge National Lab., TN.
Role of Animal Studies in Low-Dose Extrapolation.
R. J. M. Fry. 1981, 15p CONF-8104153-3
Contract W-7405-ENG-26
National Council for Radiation Protection symposium on control of radiation exposures, Washington, DC, USA, 27 Apr 1981, Portions of document are illegible. Available in microfiche only.

Current data indicate that in the case of low-LET radiation linear, extrapolation from data obtained at high doses appears to overestimate the risk at low doses to a varying degree. In the case of high-LET radiation, extrapolation from data obtained at doses as low as 40 rad (0.4 Gy) is inappropriate and likely to result in an underestimate of the risk. (ERA citation 07:044793)

DE82014060 PC **A02/MF A01**
Los Alamos National Lab., NM.
Radiobiology of Pions at LAMPF.
M. R. Raju, and N. Tokita. 1982, 21p LA-UR-82-935, CONF-820244-1
Contract W-7405-ENG-36
Radiation oncology studies international particle workshop, Houston, TX, USA, 10 Feb 1982.

Recent radiobiology data for pion beams used in therapy are presented. The biological systems used were cultured cells suspended in gelatin and intestinal crypt assay. The importance of fast neutrons from pion stars in large treatment volumes is discussed. The data for compensating the depth dose distribution to produce uniform cell killing across the peak region are presented. The changes in biological effectiveness with peak width for pion beams (unlike heavy ions) are small because of fast neutron contribution from pion stars. The need for innovative radiobiology programs to guide high-LET radiotherapy is discussed. (ERA citation 07:044811)

DE82014888 PC **A04/MF A01**
California Univ., Livermore. Lawrence Livermore Lab.
Evaluation of the Neutron Dose Received by Personnel at the LLNL.
D. E. Hankins. 1 May 82, 61p UCID-19385
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche only after original copies are exhausted.

This report was prepared to document the techniques being used to evaluate the neutron exposures received by personnel at the LLNL. Two types of evaluations are discussed covering the use of the routine personnel dosimeter and of the albedo neutron dosimeter. Included in the report are field survey results which were used to determine the calibration factors being applied to the dosimeter readings. Calibration procedures are discussed and recommendations are made on calibration and evaluation procedures.

DE82015007 PC **A04/MF A01**
Oak Ridge Associated Universities, Inc., TN. Manpower Education, Research and Training Div.
Radiation Protection Enrollments and Degrees, 1981.
J. R. Little, D. L. Shirley, and L. M. Blair. May 82, 60p ORAU-198
Contract AC05-76OR00033
Microfiche only after original copies are exhausted.

This report presents data on the number of students enrolled and the degrees awarded in academic year 1980-81 from 61 U.S. universities offering degree programs in radiation protection or related areas that would enable students to work in the health physics field. The raport includes historical survey data for the last decade and provides information such as trends by degree level, foreign national student participation, female and minority student participation, and placement of graduates. Also included is a listing of the universities by type of program and number of students.

DE82016045 PC **A05/MF A01**
Oak Ridge National Lab., TN.
Specific gamma-Ray Dose Constants for Nuclides Important to Dosimetry and Radiological Assessment.
L. M. Unger, and D. K. Trubey. May 82, 81p ORNL/RSIC-45/Rev.1
Contract W-7405-ENG-26

Tables of specific gamma-ray dose constants (the unshielded gamma-ray dose equivalent rate at 1 m from

a point source) have been computed for approximately 500 nuclides important to dosimetry and radiological assessment. The half life, the mean attenuation coefficient, and thickness for a lead shield providing 95% dose equivalent attenuation are also listed.

N82-31838/7 PC **A09**/MF **A01**
Department of Atomic Energy, Bombay (India).
Second Special Symposium on Natural Radiation Environment.
1981, 187p INIS-MF-6530, CONF-810153
Prepared in Cooperation with Indian Association for Radiation Protection, Bombay. Symp. Held at Bombay, 19-23 Jan. 1981.

A wide range of geological radioactive anomalies is discussed. Emphasis is placed on the effort to locate and describe the characteristics of areas of high natural radioactivity. Topics covered include: analysis of Ra-226 and other heavy radionuclides in samples of food and water and environmental radon studies and the incidence of radon, thorium, and uranium in biological tissues.

PB83-111476 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
Actions Being Taken to Help Reduce Occupational Radiation Exposure at Commercial Nuclear Powerplants.
24 Aug 82, 40p GAO/EMD-82-91
Errata sheet inserted.

Workers who operate and maintain commercial nuclear powerplants are exposed to low doses of radiation. Although exposures to individual workers have remained relatively constant, the total dose received by all nuclear powerplant workers has increased dramatically during the history of nuclear powerplant operations. This report identifies the extent of the occupational exposure increase and examines (1) the causes for the increase, (2) the potential impacts of this increase, and (3) Federal and industry efforts to reduce occupational exposures. Because many of these efforts have only been recently implemented or are still in the developmental stage, it is too early to determine how effective these actions will be. Nevertheless, GAO believes that the actions taken or planned to date are a step in the right direction.

PB83-114837 PC **E09**/MF **E09**
Commission of the European Communities, Luxembourg.
Information Seminar on the Radiation Protection Dosimeter Intercomparison Programme (3rd) (Beta Intercomparison) Held in Grenoble, October 6-8, 1980.
c1981, 211p EUR-7365-EN, ISBN-92-825-2797-2c
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The objective of the intercomparisons is to improve the monitoring of exposure to radiation and to establish a common basis for dose assessment. For the first time, an intercomparison with beta dosimeters has been carried out. There is still a great deal of uncertainty in this sector of dosimetry, and methods and measuring instruments need to be improved. The results of these intercomparisons have been discussed, and topics of general interest in this field have been reported at this 'Third information seminar on the European radiation protection intercomparison programme', held in Grenoble, October, 6-8 1980. The original papers given at the seminar are presented with comments and conclusions compiled by the editing committee.

6S. Stress Physiology

AD-A119 592/4 Not available NTIS
Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).
Postural Stability during Slow-Onset and Rapid-Onset Hypoxia.
D. E. Holness, W. D. Fraser, D. E. Eastman, J. A. G. Porlier, and M. A. Paul. 1982, 5p Rept no. DCIEM-RP-81-P-41
Availability: Aviation, Space and Environmental Medicine, v53 n7 p647-651 Jul 82 (No copies furnished by DTIC/NTIS).

No abstract available.

N82-31944/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Effect of Synthesized Propeller Vibration on Passenger Annoyance in a Turboprop Interior Noise Environment.
S. A. Clevenson. Aug 82, 20p NAS 1.15:84515, L-15298, NASA-TM-84515

The effect of synthesized propeller vibration on passenger annoyance to aircraft noise was investigated in passenger ride quality apparatus. Passenger reactions of annoyance to a wide range of potential turboprop interior noise environments were obtained under three simulated vibration conditions: no vibration, armrest vibration, and armrest plus cabin vibration. The noises, ranging from 71 to 95 dB(A) consisted of a turbulent boundary layer with a factorial combination of five blade passage frequencies (50 to 200 Hz), two harmonic roll offs, and three tone to noise ratios. Results indicate that passenger annoyance to noise in the presence of armrest vibration did not significantly change. However, those passengers exposed to cabin plus armrest vibration while being exposed to noise lower rating for the combined cabin vibration and noise environment compared with the rating for the noise along environment. This result is predicted by the ride quality model.

PB83-111773 PC **A03**/MF **A01**
Nederlands Inst. voor Praeventieve Gezondheidszorg TNO, Leiden.
Gehoorscherpte en Geluidbelasting bij 201 Manlijke Adolescenten Hearing Acuity and Exposure to Noise in 201 Male Adolescents),
H. E. Lindeman, and G. A. de Jonge. Jul 79, 42p
Text in Dutch.

In connection with primarily foreign reports on reduction of hearing acuity in young people as a result of leisure time noise (primarily through pop music), a study was performed comprising 201 male adolescents in Leiden and vicinity, ranging in age between 16 1/4 years and 20 1/3 years (average 17 1/2 years), all of them born prior to August 1960. They were all students of schools (Louise de Coligny and the Secondary Technical School of Leiden) located in the immediate vicinity of the Netherlands Institute for Preventive Health Care, where the study was performed. In 12.5 percent of these students, a permanent hearing disturbance was established, in most of the cases of a very limited extent. For the age group examined, no previous reliable data on hearing acuity exist. From a comparison of hearing acuity and continued exposure to noise it does not appear that there is any connection between the two. This does not exclude the possibility that in some of them such a causal relationship did, indeed, exist. Further insight into these problems may only be attained through prospective periodic research.

PB83-800664 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Aircraft Sonic Boom: Biological Effects. 1964-September, 1982 (Citations from the NTIS Data Base).
Oct 82, 96p
Supersedes PB81-807919 and PB80-810310.

The selected abstracts of research reports cover the effects of sonic booms on humans, animals, birds, and fish. Discussions of biophysics, psychoacoustics, stress, and auditory tolerances are presented, along with materials on startle responses, disturbance, and compression wave reactions. (This updated bibliography contains 88 citations, 2 of which is a new entry to the previous edition.)

6T. Toxicology

AD-A119 591/6 Not available NTIS
Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).
Detection of Diazepam and Determination of Time of Ingestion.
Research paper,
Linda J. McBurney. 1981, 13p Rept no. DCIEM-RP-80-P-33
Summary in French.
Availability: Pub. in Canadian Society Forensic Science Jnl., v14 n4 p152-164 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 674/0 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Effects of Nonadecafluorodecanoic Acid on Tissue Fatty Acids of the Rat.
Doctoral thesis,
Carl Thomas Olson. 1982, 79p Rept no. AFIT/CI/NR/55D

The effects of intraperitoneal injection of nonadecafluoro-n-decanoic acid (NDFDA) on liver, testes, and blood fatty acids were investigated. The hypothesis that NDFDA affects the relative amounts of the six major tissue fatty acids was tested. Effects of fatty acid ratios observed after NDFDA exposure were compared with those seen after injection of propylene glycol, injection of propylene glycol with pair-feeding, and injection and perfluorooctanoic acid (PFOA). The lethal response of rats injected with NDFDA, when plotted on a log dose versus time basis, does not appear similar to that of rats injected with PFOA. At higher doses, there is a similarity in response, but, as the dosage is lowered, a second mechanism of toxicity seems to occur in NDFDA-treated rats. Compared with control ratios, the greatest changes in relative amounts of the six major fatty acids after treatment with NDFDA occur in the liver. The mechanisms of toxicity of NDFDA remain in doubt. Oxidation of fatty acids leading to production of prostaglandins or other biologically-active derivatives which adversely affect physiological activities may be occurring. The decrease in relative fraction of arachidonic acid may give credence to this theory. A direct effect on membrane function can also be advocated since recent experimentation has demonstrated a decreased erythrocyte osmotic fragility in rats injected with NDFDA.

AD-A119 706/0 PC **A02**/MF **A01**
Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
Evaluation of the Embryotoxicity of Hydrazine in Rats.
Technical rept. May 78-Jan 82,
William C. Keller, Carl T. Olson, Kenneth C. Back, and Charles L. Gaworski. Aug 82, 16p Rept no. AFAMRL-TR-82-29

Hydrazine (Hz) was evaluated for embryotoxic and teratogenic potential in rats. The Pregnant Fischer 344 (F-344) rats were treated with 0, 2.5, 5.0, and 10.0 mg Hz/kg ip on gestation days 6-15. Dose-related embryolethality and maternal toxicity were observed at the two higher doses. Pregnant F-344 rats were treated with 10.0 mg Hz/kg ip on gestation days 7-9, 10-12, or 13-15. The prenatal period most susceptible to Hz toxicity was days 7-9. Embryolethality and an increase in the incidence of anomalies, but not major malformations, were observed in this group. Pregnant F-344 rats were percutaneously treated with 0, 5.0, and 50.0 mg Hz/kg on gestation day 9. The higher dose produced a high incidence of embryolethality. Pregnant F-344 rats were treated with 10.0 mg Hz/kg ip on gestation days 7-9. Pups were evaluated for postnatal effects of prenatal Hz treatment. An increase in prenatal mortality was observed, but none of the developmental parameters monitored including weight gain, ear detachment, incisor eruption, eye opening, surface righting, cliff avoidance, forward motion, and swimming ability were adversely affected. The principal toxic effect of prenatal Hz treatment was embryolethality which was observed at doses which produced maternal toxicity. (Author)

DE82006826 MF **A01**
Oak Ridge National Lab., TN.

Studies on the Mode of Action of Chemical Carcinogens in Cultured Mammalian Cells.
C. Jones, and E. Huberman. 1981, 37p CONF-8103119-2
Contract W-7405-ENG-26
Symposium on organ and species specificity in chemical carcinogenesis, Raleigh, NC, USA, 2 Mar 1981, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

It has been shown that most carcinogens require metabolic activation to electrophilic reactants prior to exerting their toxic effects. Such reactive metabolites are capable of binding to cellular macromolecules including DNA, suggesting the production of critical mutations as the initial event in the process of tumor development. Indeed most chemical carcinogens have been shown to act as mutagens as well. For an accurate assessment of the genetic risk from exposure to these chemicals, it is not sufficient to merely indicate mutagenic potential. It must be shown that a quantitative relationship exists between carcinogenicity and mutagenicity and that the same metabolites are responsible in both cases. In order to make a valid extrapolation from the in vitro systems to man, one must devise systems which should also take into account the organ and/or species specificity of the carcinogens. Some classes of chemicals do not appear to act via a mutational mechanism and yet can influence the development of tumors. These chemicals are thought to act subsequent to an initiation event caused by another chemical and amplify or promote the development of tumors. It would be useful to devise simple in vitro systems in which both the identity and mode of action of such chemicals can be investigated. The results obtained from such an approach and the conclusions drawn from these studies are discussed. It was found that the human cell lines, HL-60 and HO melanoma, may offer a useful model for studying the mode of action of certain classes of tumor promoters and in evaluating some unknown chemicals for this activity. The cell-mediated mutagenesis assays enable the mutagenic and hence possibly, the initiating activity of a chemical to be investigated, whereas specific alterations in the growth and cell differentiation of human cells such as the HL-60 myeloid cells produced by a chemical may be indicative of a tumor-promoting potential. (ERA citation 07:044830)

DE82011442 MF **A01**
Oak Ridge National Lab., TN.
General-Linear-Models Approach for Comparing the Response of Several Species in Acute-Toxicity Tests.
K. L. Daniels, J. C. Goyert, M. P. Farrell, and R. H. Strand. 1982, 14p CONF-820219-3
Contract W-7405-ENG-26
SAS Users Group international meeting, San Francisco, CA, USA, 14 Feb 1982, Portions of document are illegible.
Available in microfiche only.

Acute toxicity tests (bioassays) estimate the concentration of a chemical required to produce a response (usually death) in fifty percent of a population (the LC50). Simple comparisons of LC5C values among several species are often inadequate because species can have identical LC50 values while their overall response to a chemical may differ in either the threshold concentration (intercept) or the rate of response (slope). A sequential approach using a general linear model is presented for testing differences among species in their overall response to a chemical. This method tests for equality of slopes followed by a test for equality of regression lines. This procedure employs the Statistical Analysis System's General Linear Models procedure for conducting a weighted least squares analysis with a convariable. (ERA citation 07:051804)

DE82013404 MF **A01**
Lawrence Livermore National Lab., CA.
Role of Human- and Animal-Sperm Studies in the Evaluation of Male Reproductive Hazards.
A. J. Wyrobek, L. Gordon, and G. Watchmaker. 7 Apr 82, 24p UCRL-87236, CONF-8108125-1
Contract W-7405-ENG-48
Latin American course in genetic toxicology, Mexico City, Mexico, 24 Aug 1981.
Best available copy from document source. Available in microfiche only.

Human sperm tests provide a direct means of assessing chemically induced spermatogenic dysfunction in man. Available tests include sperm count, motility, morphology (seminal cytology), and Y-body analyses. Over 70 different human exposures have been monitored in various groups of exposed men. The majority of exposures studied showed a significant change from control in one or more sperm tests. When carefully controlled, the sperm morphology test is statistically the most sensitive of these human sperm tests. Several sperm tests have been developed in nonhuman mammals for the study of chemical spermatotoxins. The sperm morphology test in mice has been the most widely used. Results with this test seem to be related to germ-cell mutagenicity. In general, animal sperm tests should play an important role in the identification and assessment of potential human reproductive hazards. Exposure to spermatotoxins may lead to infertility, and more importantly, to heritable genetic damage. While there are considerable animal and human data suggesting that sperm tests may be used to detect agents causing infertility, the extent to which these tests detect heritable genetic damage remains unclear.

PB83-107177 PC **A03**/MF **A01**
Leiden Rijksuniversiteit (Netherlands). Gorlaeus Labs.
Chemicalien als Kankerverwekkende Agentia (Chemicals as Cancer Causing Agents).
Final rept.,
S. J. Roora, A. J. Baars, P. van Bladeren, J. Lugtenburg, and H. P. W. Vermeeren. Feb 81, 45p
Text in Dutch.

The Dutch work group was established in 1980 for the purpose of studying a way in which chemical and pharmaceutical laboratories ought to be managed in their processing of chemicals which exhibit possible cancer causing tendencies or have characteristics which may upset hereditary factors. In Feb 1981 this work group came up with a report on this research and it is presented herewith. The report deals with known carcinogenic and mutagenic chemicals and other cancer causing factors such as radiation, bacteria, certain substances and compounds, and the importance which must be attached to the long term dangers of certain of these substances. The report explains uncontrolled cellular growth, how it begins and develops. Mutation tests on bacterias of the salmonella strain are described because of their retroactive mutative sensitivity. Among many other things the report points out that dosages of carcinogenic substances have a cumulative effect, but that in some instances even a one time dosage will cause cancer. Report contains a number of charts with English explanations, others with Dutch explanations. A long list of literature and references is also provided.

PB83-107540 PC **A06**/MF **A01**
Stichting Bedrijfsgezondheidsdienst voor de Bouwnijverheid, Amsterdam (Netherlands).
Arbeidshygieunisch Onderzoek naar de Blootstelling van Onderhoudsschilders aan Oplosmiddelen (Job-Hygienic Study into the Exposure of Maintenance Painters to Solvents).
Final rept. 1979-81,
T. M. L. Scheffers, and F. J. Jongeneelen. Dec 81, 110p
Text in Dutch.

Report discusses the safety levels of the many paint solvents handled in the painting trades. It begins with a presentation of the data which is already available regarding the harmful effects of exposure to leads (appearance of cancer cells, eczema, irritations, pre-narcotic effects, effects on the liver, kidneys, the nervous system and behavior). It then goes into the many other types of chemical solvents and reports on the studies conducted on persons who are exposed to them because of their trade. Air sampling tests are made and the results explained. Reports are presented on the biological monitoring of the many types of solvents which are absorbed by the body as a result of many forms of contacts and the degree of their presence in blood, urine, hair, nails, etc. The various forms of monitoring are explained e.g. by amount of ventilation, by type of solvents employed, by type of activities such as house painting, furniture painting, laboratory activities, etc. Detailed results are presented.

PB83-111351 PC **A07**/MF **A01**
Battelle Columbus Toxicology Program Office, Vienna, VA.
The Lethality and Toxicity of Intravenously Administered Mercaptopurine (NSC 755) in BDF1 Mice.
Final rept. 2 Mar 79-5 May 80,
Donald C. Emmerling, David J. Donofrio, W. D. Kerns, and B. K. Wood. 17 Jun 81, 134p DEBW-755-80-4
Contract N01-CM-4-3746

The lethality of mercaptopurine (NSC 755), administered by intravenous injection was determined in male and female BDF(1) mice using a single dose or a five consecutive daily dose schedule. In subsequent studies the toxicity of mercaptopurine was determined using the LD50, LD10, and 1/2 LD10 via the same injection schedule and route as that used in the lethality studies. The extent of recovery from treatment induced toxicity was assessed by comparison of both clinical and histological changes observed between those animals sacrifced two days after the last injection versus those sacrificed after 14 treatment free days. Drug-related intoxication was characterized histologically by adverse changes in liver, bone marrow, gastrointestnal tract and vaious lymphoid tissues. Hematological findings of suppressed erythroid activity correlated well with morphological abnormality. The multiple dose exposure to mercaptropurine was shown to be more effective in producing intoxication. Recovery from drug-induced toxicity was observed as a reduction in the incidence and severity of abnormality in mice surviving to termination of the study.

PB83-112870 PC **A05**/MF **A01**
Franklin Research Center, Silver Spring, MD.
Trichloropropanes.
Rept. no. 4.
7 Aug 81, 91p NIOSH-210-79-0091
Contract PHS-NIOSH-210-79-0091

The health effects associated with trichloropropane (25735299) exposure were reported. The chemical and physical properties, as well as the various uses of trichloropropanes, were presented. The biological processes of absorption, distribution, metabolism, and modes of degradation were described. Effects on human skin, eyes, respiratory system, central nervous system and the major organs, following exposures to trichloropropanes, 1,2-dichloropropanes, and tetrachloroethylene (127184), were reviewed. Acute and chronic animal toxicology data and results of carcinogenicity, mutagenicity, and teratogenicity testing were reported.

PB83-114298 PC **A99**/MF **A01**
Battelle Toxicology Program Office, Vienna, VA.
Preclinical Intravenous Toxicity Study of Echinomycin (NSC-526417) in CDF1 Mice and Beagle Dogs.
Phase 2 rept. (Final) Jan 81-Mar 82,
G. N. Rao, B. Boysen, G. Thompson, S. Glaza, and B. Dickie. 22 Mar 82, 679p
Contract N01-CM-1-7365
Also pub. as Hazelton Raltech, Inc., Madison, WI. rept. nos. 81005-81010 and RAL-82/1092.

Groups of CDF1 mice were administered graded doses of Echinomycin (NSC-526417) by intravenous injection (Single Dose Study and Five Daily Dose Study). The major pharmacotoxic signs observed were hypoactivity, ataxia, ruffled fur, decreased limb tone, impaired use of the hind limbs, bradypnea, and death. There was an inhibition of the rate of growth in treated animals that was reversible. Groups of CDF1 mice were administered Echinomycin (NSC-526417) by intravenous injection at the respective LD50, LD10, and 1/2 LD10 dose levels. The pharmacotoxic signs observed in mice of both studies included hypoactivity, ataxia, ruffled fur, decreased limb tone, and impaired use of the hind limbs. In addition, bradypnea and death were seen in the five daily dose study. The rate of growth was inhibited in both sexes, but recovery was seen by termination. Graded doses of Echinomycin (NSC-526417) were administered intravenously to beagle dogs. Clinical signs included hypoactivity, emesis, ataxia, ptyalism, slight body weight loss, decreased feed and water intake and lethality.

7. CHEMISTRY

7A. Chemical Engineering

AD-A119 517/1 PC A02/MF A01
Naval Facilities Engineering Command, Alexandria, VA.
Helium Plants and Storage. Design Manual 24.2.
Final design criteria.
Jun 80, 25p Rept no. NAVFAC-DM-24.2
Supersedes Chapter 2 of Rept. no. NAVFAC-DM-24 dated Jun 75.

Basic design guidance for helium storage, repurification, and distribution facilities, Category Code 142, is presented for use by experienced architects and engineers. The contents include helium characteristics, storage data, handling techniques, receiving facilities, working pressures, pipe sizing and strengths, valving, and cleaning and condensing techniques. (Author)

AD-A119 698/9 Not available NTIS
Massachusetts Inst. of Tech., Cambridge. Dept. of Electrical Engineering and Computer Science.
Phosphorus Incorporation during Silicon Epitaxial Growth in a CVD Reactor,
R. Reif. 17 Sep 81, 8p ARO-18083.1-EL
Contract DAAG29-81-K-0087
Availability: Pub. in Jnl. of the Electrochemical Society, v129 n5 p1122-1128 May 82 (No copies furnished by DTIC/NTIS).

No abstract available.

CONF-791169-1 PC A04/MF A01
Argonne National Lab., IL.
Failure Analysis of Coal-Gasification Pilot Plant Components.
S. Danyluk. Sep 79, 60p
Contract W-31-109-ENG-38
International coal utilization exhibition and conference, Houston, TX, USA, 6 Nov 1979, Portions of document are illegible.

Argonne National Laboratory has an active and ongoing program in failure analysis of components from coal-gasification pilot plants and energy technology centers. The analyses contribute to a knowledge base which can be used for specifying proper materials and designs to increase component life. Data have been obtained on failed components fabricated from a broad variety of materials and exposed to diverse environmental conditions. Although each gasification system is unique, each scheme may be subdivided into five process locations which differ with respect to temperature, pressure and corrosive environment. These are the coal-handling system, transport lines, gasifier, hot gas-stream cleanup system, and solids-disposal system. The failure modes are generally mechanical in coal-handling regions; mechanical failures, stress-corrosion cracking (SCC) and localized corrosion dominate in the transport lines. Failures in gasifier components are mainly due to sulfidation, sulfur grain-boundary embrittlement, SCC and erosion, processes to be expected in regions of high temperature and solid-particle throughput. Solid-particle erosion is the dominant failure mechanism in hot gas-stream cleanup areas, and corrosion and erosion are the principal failure modes associated with solids disposal. Two specific failures from the IGT U-Gas pilot plant, which represent typical analyses of components from the gasifiers, are discussed. (ERA citation 05:014640)

DE82007932 PC A10/MF A01
City Coll., New York.
Improved Techniques for Gasifying Coal. Final Report, July 1, 1976-January 31, 1980.
R. A. Graff, A. I. LaCava, and J. Yerushalmi. 1980, 204p DOE/ET/10623-T3-Pt.1, FE-2340-F-Pt.1
Contract AS01-76ET10623
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The objective of the program is to lay the groundwork for a development by industry of new techniques for converting coal into gaseous and liquid products. The program explores: (1) the underlying features and operating characteristics of beds of fine solids fluidized at high velocities, especially the fast fluidized bed and the turbulent bed; (2) the flash heating of raw coals in gases containing hydrogen at elevated pressures with control of the residence time of the vapor; and (3) the flash heating of raw coals in steam at high pressures. Summaries and detailed description of the following research programs for the periods July 1, 1976 to January 3, 1980 are presented: (1) high velocity fluidized beds; (2) flash hydrogenation; (3) reactor design for flash hydrogenation; (4) flash hydrolysis. Part 1 contains the summaries and description of investigations on high velocity fluidized beds. The remaining three programs are in Part 2 of this final report. (ERA citation 07:045505)

DE82008213 MF A01
Hydrocarbon Research, Inc., Lawrenceville, NJ.
Laboratory Program to Support H-Coal Pilot-Plant Operations. Volume II. PDU Run 8.
Feb 82, 122p DOE/ET/10152-T11-V.2, FE-2547-46-Vol.2
Contract AC05-77ET10152
Portions of this report are illegible.
Best available copy from document source. Available in microfiche only.

No abstract available.

DE82008859 PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Flash Hydropyrolysis of Coal. Quarterly Report Nos. 14/15, October 1, 1980-March 31, 1981.
M. Steinberg, and P. Fallon. Jul 81, 24p BNL-51483
Contract AC02-76CH00016

The following conclusions can be drawn from this work: (1) Approximately 40 to 45% of the carbon contained in Kentucky No. 9 coal can be hydrogenated to gaseous hydrocarbon products at 900 exp 0 C and 1000 psi and residence times of 1 second or more. (2) At the same conditions, approximately 20% total liquid hydrocarbon products containing 10% BTX and 10% light oils can be formed. (3) At 1000 exp 0 C and 800 psi, as much as 50% gaseous hydrocarbon products can be formed. This is at the expense of the liquid yields which drop to approximately 10% consisting of 7% BTX and 3% light oils. (4) At coal residence times of less than 2.5 seconds the gaseous hydrocarbon yields at 900 exp 0 C and pressures ranging from 800 to 1200 psi, increase at a rate of 6% per second of coal particle residence time. (5) Gaseous hydrocarbon yields increase with hydrogen pressure at the rate of 10% per 200 psi when hydrogenating Kentucky No. 9 coal at 900 exp 0 C and between 800 and 1200 psi. (6) An increase in particle size from an average of 100 mu to an average of 165 mu decreased the particle residence time by about 67% from 1.58 sec to 0.94 sec without a measureable change in yields. (7) Approximately 4% CO is formed and no CO sub 2 is formed when hydrogenating Kentucky No. 9 coal. (8) A significant difference is seen in the light oils produced from Kentucky No. 9 coal when run at 900 exp 0 C and 1000 psi and when run at 1000 exp 0 and 800 psi. At 900 exp 0 C, 25% naphthalene is formed and at 1000 exp 0 C, 35% is formed. Also at 900 exp 0 C, 4% benzopyrene is formed and at 1000 exp 0 C 2% benzopyrene is formed. (9) Additional work is necessary to further identify the constituents of the light oils. (10) In none of the light oil samples produced from Montana Rosebud sub-bituminous coal did the sulfur concentration exceed 0.3%, the limit considered maximum for further hydrotreatment. (11) Most of the 3.7% sulfur (68%) found in the Kentucky No. 9 coal is in the organic form. (ERA citation 07:041986)

DE82010591 PC A19/MF A01
Mechanical Technology, Inc., Fairfax, VA.
Risk Assessments: The Performance and Supply of Commercially Available Process Equipment for Full Scale Coal Gasification and Liquefaction Plants. Phase II. Final Report.
M. R. Schmid. Jan 82, 450p DOE/MC/14273-1129
Contract AC21-80MC14273
Portions of document are illegible.
Microfiche only after original copies are exhausted.

A broad-brushed assessment was made of the risks involved in using commercially available equipment in full-scale coal liquefaction and gasification plants. Since a detailed treatment of all processes was beyond the scope of this study, an approach which would indicate the general nature of the risks involved in the performance and supply of commercial equipment was selected. Flow diagrams and equipment lists were prepared for a coal liquefaction process which was based on published data for commercial coal liquefaction and gasification plants. The generalized process plant consists of five identical trains, each operating at 6000 tons per day coal feed rate and producing 20,000 barrels per day oil equivalent. In addition, assorted by-products including carbon dioxide, slag, water, sulfur, ammonia, and acids are produced. (ERA citation 07:052500)

DE82011171 MF A01
International Coal Refining Co., Allentown, PA.
SRC-1 Quarterly Technical Report, April-June 1981.
Oct 81, 323p DOE/OR/03054-4-V.1
Contract AC05-78OR03054
Portions of document are illegible.
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Twenty-three papers involving the design, materials and equipment for the SRC-1 demonstration coal liquefaction plant near Newman, Daviess County, Kentucky, have been entered individually into EDB and ERA. A number of the papers deal also with the analytical methodology required for the plant, including a rather detailed evaluation of the accuracy requirements and careful evaluation of several methods such as gas chromatography, mass spectroscopy, nuclear magnetic resonance, etc. Flexibility of design is stressed so that products can be optimized for the market and charged if the market requires different products. (ERA citation 07:042048)

DE82011897 PC A02/MF A01
Texaco, Inc., South El Monte, CA. Montebello Research Lab.
Gasification of Residual Materials from Coal Liquefaction. Type I Evaluation of H-Coal Liquefaction Residue from Illinois No. 6 Coal as a Feedstock for the Texaco Gasification Processes.
A. M. Robin. Nov 81, 11p DOE/ET/10137-T2
Contract AC01-76ET10137

A laboratory evaluation of a 20-pound sample of Vacuum Tower Bottoms from the H-Coal liquefaction pilot plant at Catlettsburg, Kentucky was completed at Texaco's Montebello Research Laboratory. The sample, which was obtained from the liquefaction of Illinois No. 6 coal, was judged to be a suitable feedstock for the Texaco Gasification Processes. It can be charged directly to the gasifier as a molten fluid at a temperature of about 450 exp 0 F or it may be charged at ambient temperature as a water slurry of ground residue. Based on these results, operating conditions and yields were estimated for gasifying 1000 pounds per hour of molten undiluted residue and for gasifying 1600 pounds per hour of solid residue in a water slurry both at a pressure of 1200 psig. (ERA citation 07:042003)

DE82012323 PC A02/MF A01
Arrowhead Plastic Engineering, Inc., Muncie, IN.
Separation of Alcchol-Water Mixtures by Selective Adsorption. Semi-Annual Technical Progress Report.
R. J. Dearborn. 23 Mar 82, 7p DOE/R5/10297-1
Contract FG02-81R510297

The intent is to chemically modify polyvinyl chloride so as to convert it to a material capable of selectively adsorbing ethyl alcohol from alcohol-water mixtures. This concept differs from the more conventional technique in which water is absorbed from the mixture by, for example, molecular sieves. The approach is to attempt to remove alcohol from mixtures containing a low percentage of alcohol. Such a solution might originate directly from the fermentation process and contain approximately 10% alcohol, or it might consist of distillation residues containing low alcohol concentrations that are uneconomical to handle by further distillation. (ERA citation 07:046106)

DE82012538 PC A06/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.

Extraction of Phenols from Water with Tri-Octyl Phosphine Oxide.
J. D. MacGlashan. Mar 82, 120p LBL-13963
Contract AC03-76SF00098
Thesis.

Tri-octyl phosphine oxide (TOPO) was examined as an extractant for removing phenol; the dihydric phenols catechol, resorcinol, and hydroquinone; and the trihydric phenols pyrogallol, phloroglucinol, and 1,2,4-benzenetriol from water. Distribution coefficients were measured and results modelled for extractions with different diluents, solvent compositions, temperatures, and extractant-to-solute stoichiometric ratios. Modelling of the results indicates that the extraction mechanism is complicated, with the diluent probably playing an important role. The most effective diluents are those that have some electron-donating ability and are thus able to solvate the solute-TOPO complex, without competing with the solute for the phosphoryl oxygen on TOPO. The distribution coefficients decrease with increasing temperature, and show a linear dependence when plotted as ln(K/sub D/) vs. I/T. (ERA citation 07:048081)

DE82012547 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Boundary-Layer Control by Means of Strong Injection.
R. J. Yang. Feb 82, 63p LBL-13807
Contract AC03-76SF00098
Thesis.

The gas mixture produced by a coal gasifier contains components which have serious corrosive effects on the walls of the pipe flow system. To reduce these, a noncorrosive gas is injected into the stream of the coal gas products, in a direction parallel to the pipe wall. The interaction between the injected stream and the original pipe flow is investigated analytically and is an example of the so-called Wall Jet Problem. The model adopted is that of a two-dimensional incompressible turbulent free mixing layer, with the corrosive gas H sub 2 S forming the upper stream and moving faster than the injected non-corrosive gas in the lower stream, the latter bounded by the solid wall of the pipe. This wall jet flow can be divided into three distinct regions. In the first, farthest upstream, the upper (main) stream interacts with the lower injected stream in a free mixing process, while a turbulent boundary layer develops along the pipe wall bounding the lower stream. In the second region the lower half of the free mixing layer interacts with the wall turbulent boundary layer. In the third region, stream mixing has been completed and all diffusion takes place in a thickened turbulent boundary layer. (ERA citation 07:042085)

DE82012708 MF **A01**
Wisconsin Univ.-Madison. Dept. of Chemical Engineering.
Adaptive Inferential Control Applied to Distillation Column Model.
M. Shahrokhi, and M. Morari. Nov 81, 15p DOE/ER/10645-3, CONF-811108-19
Contract AC02-80ER10645
Annual meeting of the Institute of Chemical Engineers, New Orleans, LA, USA, 8 Nov 1981, Portions of document are illegible.
Available in microfiche only.

An adaptive control scheme which uses the composition estimates to control the overhead concentration of a distillation column is proposed. The composition estimates are obtained through tray temperature measurements via a least squares identifier. The performance of the proposed scheme is compared with some other control schemes by applying them to a distillation column model.

DE82013306 MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Coal-Hydrogasification Process Development. Quarterly Technical Progress Report, January 2, 1982-April 2, 1982.
Apr 82, 12p DOE/ET/10328-42
Contract AC01-78ET10328
Portions of document are illegible.
Available in microfiche only.

Principal activities were related to the ongoing receipt and acceptance test monitoring of advance procured components for the 3/4-TPH IPDU facility. Also continued were engineering contacts with two valve suppliers experiencing manufacturing problems with advance procured components. Both of these manufacturers appear to have solved their problems. Previously-ordered equipment such as the integral orifice delta-P flow transmitters and pressure gages were received. Final system configuration checkout of the Beckman MV-8000 microprocessor controller for the IPDU has been initiated and is rescheduled to be completed in the latter part of April 1982. Preparation of graphic control drawing has been completed by Rockwell Engineering, and a purchase order has been submitted to Beckman Instruments. Assembly and checkout of the acoustic emission (AE) monitoring equipment for the IPDU was resumed. All individual components and subassembly chassis were checked out, and assembly of the AE system was approximately 95% completed. (ERA citation 07:045501)

DE82013324 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Electrochemistry Applied to Biomass. Progress Report, October 1980-September 1981.
H. L. Chum. Apr 82, 42p SERI/PR-622-1321
Contract AC02-77CH00178

The electrochemical conversion of biomass-derived compounds, obtained through thermochemical pretreatments, into valuable organic chemicals, petrochemical substitutes, and energy-intensive chemicals is investigated. A hardwood-derived lignin obtained from ethanol extraction of the explosively depressurized aspen has been investigated. We have partially characterized this lignin material, and have also submitted it to electrolyses under controlled potential. The electrolytic conditions employed so far affect mainly the carbonyl groups of the ethanol-extracted steam-exploded aspen lignin. We have some evidence of demethoxylation and changed phenolic content after electrolysis. During product isolation, fractionation of the lignin occurs. The material with decreased methoxyl content may be suitable to replace phenol in phenol-formaldehyde-type resins. We are continuing these electrochemical and chemical investigations. Gel-permeation chromatography is being used to separate and characterize the several lignin fractions. In addition, we are carrying out electrolyses under more powerful reducing conditions which may lead to the cleavage of the main bonds in the lignin molecule (the beta -0-4 ether linkages) producing monomeric and dimeric phenolic compounds. The electrochemistry and photoelectrochemistry of levulinic (4-oxo-pentanoic) acid, the major product of controlled degradation of cellulose by acids, have been investigated. This acid can be viewed as a major product of biomass thermochemical pretreatment or as a by-product of acid hydrolysis to fermentable sugars. Since this acid can be present in waste streams of biomass processing, we investigated the photoelectrochemical reactions of this acid on slurries composed of semiconductor/metal particles. The semiconductor investigated was undoped n-TiO sub 2 , as anatase, anatase-rutile mixture, or rutile.

DE82013376 MF **A01**
Brown Univ., Providence, RI. Div. of Engineering.
Heterogeneous Kinetics of Coal Gasification. Technical Progress Report, 1 August 1981-31 January 1982.
O. Sy, and J. M. Calo. Feb 82, 109p DOE/PC/40786-1
Contract FG22-81PC40786
Portions of document are illegible.
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The continuing development of an experimental apparatus for the study of the heterogeneous reactions of coal-char gasification under conditions of industrial significance is described. The apparatus consists of: (1) a continuous gas flow, fixed solids gradientless reactor; (2) an automatic gas addition system for generating concentration perturbations in the reactor feed stream under conditions of constant flow rate, temperature, and pressure; and (3) a supersonic, modulated molecular beam mass spectrometer sampling system to monitor and resolve the transient response of the gas phase composition at the reactor exit. Work was concentrated on experimental runs of the transient behavior of the char-CO sub 2 reaction system. In addition, reactor mixing performance and estimates of possible interphase heat and mass transfer limitations on the kinetic rates were also determined. Modifications, testing and calibration of the beam sampling system and the mass spectrometer were also performed. Computer codes were written to simulate the transient response of the reaction system under varying experimental conditions for different mechanisms found in the literature. These codes are primarily used for model discrimination. An optimization code based on the Marquardt technique was also written for model parameter estimation from the data. (ERA citation 07:042063)

DE82013413 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor. Dept. of Chemical Engineering.
Role of Temperature, Solvent and Agitation in Coal Dissolution and Liquefaction. Quarterly Report, December 1981-February 1982.
D. E. Briggs, and S. Ebnesajjad. Mar 82, 23p DOE/PC/40811-2
Contract FG22-81PC40811

A Plexiglas reactor was constructed and experiments carried out with three mixer configurations in a sand-water system to determine the best mixer configuration and the minimum rpm to produce uniform conditions during coal dissolution. Coal dissolution experiments on Kentucky No. 9 coal were made with combinations of tetralin and 2-methylnaphthalene to obtain the optimum ratio in the solvent. The effect of beta -naphthol addition to the solvent on the dissolution of Kentucky No. 9 coal was studied. The effect of holding time at 400 exp 0 C on the dissolution of Kentucky No. 9 coal in a solvent containing 46.1 wt % tetralin, 46.1 wt % 2-methylnaphthalene, 2.9 wt % gamma -picoline and 4.9 wt % beta -naphthol was studied. (ERA citation 07:045549)

DE82013519 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Small-Scale Costs of Hydrogen Derived from Ammonia.
G. Strickland. Oct 81, 29p BNL-51487
Contract AC02-76CH00016

A systems study was made to assess the economic prospects for using purchased industrial ammonia as a hydrogen distribution and storage medium for users requiring 33 to 330 million std ft exp 3 per year (MSCFY) of hydrogen (or 0.1 to 1.0 MSCFD) at a plant capacity factor of 0.9. Projected costs to the end user were determined for the dissociated ammonia product (75 vol % hydrogen, 25 vol % nitrogen), and for ultra-high-purity hydrogen (99.999%) obtained by separation of the nitrogen. Costs were also projected for hydrogen produced by steam-reforming of natural gas, for electrolytic hydrogen, and for purchased (merchant) liquid hydrogen. The costs of ammonia and its hydrogen, and liquid hydrogen made by ocean thermal energy conversion (OTEC), are also listed for comparison. The latter costs from a recent study were updated to include more realistic (higher) hydrogen purification costs. All of the costs, expressed as 1980 $/MBTU in 1990, were obtained for two sets of forecast energy prices on the basis that advanced technology electrolyzers and OTEC products would be available in 1990. Results of the analysis showed that merchant liquid hydrogen was substantially higher in cost than all of the other options. Although hydrogen derived from industrial ammonia was significantly higher in cost than electrolytic hydrogen or hydrogen derived from OTEC ammonia, it can be produced using state-of-the-art technology. Possible reductions in the total cost of obtaining hydrogen via ammonia could make it lower in cost than electrolytic hydrogen. Hydrogen produced from natural gas was lowest in cost, among the land-based sources, for plant sizes exceeding 100 MSCFY. Other comparisons are provided, including the cost of ammonia made from coal. The criteria and methodology applied in the study are described. Uses of the product hydrogen are suggested along with recommendations for future work. (ERA citation 07:042688)

DE82013521 PC **A02**/MF **A01**
Montana State Univ., Bozeman. Dept. of Chemical Engineering.
Catalytic Hydrogenation of Coal-Derived Liquids. Interim Report, December 1981-February 1982.
L. Berg, and F. P. McCandless. Mar 82, 22p DOE/ET/10495-T5, FE-2034-26
Contract AC22-76ET10495
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The optimum relationship between temperature and space velocity for the 4% CoO, 8% MoO sub 3 , 1% NiO, 8% WO sub 3 MSU catalyst for upgrading SRC-II proved to be 425 exp 0 C and 0.5 SV, best yield; 475 exp 0 C and 0.75 SV, highest naphtha yield; and 500

exp 0 C and 1.25 SV, greatest denitrogenation. The octane number of the 40 to 205 exp 0 C gasoline from the 500 exp 0 C and 1.25 SV run is 90.3. Increasing the operating pressure from the usual 1100 psi to 2000 psi at 425 exp 0 C and 1.25 SV had a beneficial effect on denitrogenation and liquid yield but virtually no effect on desulfurization. The investigation of partially hydrogenated Koppers creosote oil as a hydrogen donor agent was begun with one hydrogenation of the creosote having been completed. The effect of adding 1.5% water to the feed SRC-II to attain specification grade denitrogenation with Harshaw HT-400 catalyst was reported by us previously. When this procedure is applied to the MSU 4% CoO, 8% MoO sub 3 , 8% WO sub 3 catalyst, it again improves the denitrogenation. A study of desulfurization of SRC-II with five different base materials having median pore diameters ranging from 90A to 220A indicated that the highest activity occurs in the 115 to 161A range, and that activity decreases as median pore diameter goes below 90A or above 160A. (ERA citation 07:045502)

DE82013717 PC **A12**/MF **A01**
Air Products and Chemicals, Inc., Allentown, PA.
Cryogenic Methane Separation/Catalytic Hydrogasification Process Analysis. Final Technical Report, 23 July 1980-23 September 1981.
J. Klosek, C. J. Gramse, and T. R. Tsao. 20 Oct 81, 269p DOE/ET/10325-T13
Contract AC01-78ET10325
Portions of document are illegible.
Microfiche only after original copies are exhausted.

In a continuing effort to further optimize the CS/R (Rockwell) Coal Hydrogasification process and the Exxon Catalytic Coal Gasification (CCG) process, DOE extended the contract study, Cryogenic Methane Separation/Catalytic Hydrogasification Process Analysis (ET-78-C-01-3044). Air Products and Chemicals, Inc. was authorized to perform additional trade-off studies which were of interest to DOE, Rockwell, and Exxon as potential capital and operating cost savings for the two, third generation coal gasification processes. The scope of this contract extension was comprised of two (2) subtasks for the CS/R (Rockwell) process and nine (9) subtasks for the Exxon CCG process. A Task I type screening study was performed for all subtasks. The results of the evaluations are summarized below. (ERA citation 07:045500)

DE82013991 MF **A01**
Advanced Fuel Research, Inc., East Hartford, CT.
Coal-Gasification Reactions with on-Line in-Situ FTIR Analysis. Second Quarterly Report, December 4, 1981-March 3, 1982.
P. R. Solomon, D. G. Hamblen, and T. G. Squires. 30 Mar 82, 67p DOE/FE/05122-T2
Contract AC01-81FE05122
Portions of document are illegible.
Available in microfiche only.

The goal of this program is to develop techniques to characterize a raw coal with a few simple tests and use this characterization to predict the coal's behavior in a gasifier. The program is presently collecting data for a series of coals in an entrained flow reactor with on-line in-situ gas analysis using a Fourier Transform Infrared (FT-IR) Spectrometer. The FT-IR analysis allows direct measurements of species evolution kinetics and kinetics of secondary reactions such as cracking, soot formation,; char gasifiction, etc. The data is being used to develop a general model for coal conversion under practical gasification conditions. The gas and tar sampling systems of the Entrained Flow Reactor were modified to afford major improvements in the accuracy of mass balance data. Temperature profiles were established for a range of injector configurations at several temperatures between 800 and 1200 exp 0 C. Calibration curves for the light gases were derived and used in experiments which measured the rates of hydrocarbon cracking under a variety of reaction conditions. The experimentally determined rates were compared with simulated rates and to previously published cracking rates. Finally, the thermochemical and thermoplastic properties determining swelling behavior were analyzed on the basis of the AFR Coal model. This analysis considered both rapid and slow heating rates and has been used to design experiments to elucidate the swelling behavior. The ultimate objective here is to develop a model which can be used to predict the tendency of a particular coal to swell under a certain set of reactor conditions and to develop methods for controlling the swelling behavior.

DE82014544 PC **A12**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Molten Salt Coal Gasification Process Development Unit. Phase 2. Final Report.
A. L. Kohl, and M. H. Slater. Apr 82, 253p DOE/ET/10296-196, ESG-DOE-13386
Contract AC21-77ET10296
Microfiche only after original copies are exhausted.

This report summarizes Phase 2 of the Molten Salt Coal Gasification program. In this process, coal is gasified by contacting it with air in a turbulent pool of molten sodium carbonate at a nominal temperature of 1800 exp 0 F. Sulfur and ash are retained in the melt, and a small stream is continuously removed from the gasifier for removal of sulfur, disposal of the ash, and regeneration of sodium carbonate. The process can handle a wide variety of feed materials, including highly caking coals, and produces an environmentally clean gas, relatively free of sulfur, tars, heavy hydrocarbons, and NO/sub x/. The PDU was designed to produce low-Btu gas while processing 1 TPH of coal at pressures up to 20 atm. It is a completely integrated facility including systems for feeding solids to the gasifier, regenerating sodium carbonate for reuse, and removing sulfur as dry powdered sodium sulfate/sulfite salt and ash as a moist filter cake. During Phase I of the contract, the plant was designed and built and five test runs were made. Phase 2 was initiated for the purpose of demonstrating improved operation of the entire system over a range of gasifier pressures. Of primary interest was improving the reliability of melt overflow system and obtaining process data up to 20 atmospheres pressure. Four PDU runs, ranging in length from 83 to 170 hours of continuous gasifier operation, included operating periods at the design coal feed rate (1 TPH), design pressure (20 atm), and design ash concentration in the melt pool (20% ash). Excellent data were obtained on the gasification step which verified the model for predicting product gas composition. Performance data were also obtained on the ash removal, sulfur removal, and sodium carbonate regeneration systems of the PDU.

DE82014917 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Calcium Silicate Cements for Desulfurization of Combustion Gases. Semiannual Progress Report, April 1-September 30, 1981.
H. J. Yoo, P. J. McGauley, and M. Steinberg. Nov 81, 31p BNL-51519
Contract AC02-76CH00016
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The sulfur removal efficiency of agglomerated cement sorbent (ACS) was tested in a fluidized bed to determine the effects of the following variables: sorbent preparation conditions; pellet size; pore size and distribution of ACS pellets; SO sub 2 concentration; reaction rate vs sulfur loading; temperature; and fluidizing gas velocity. The sulfation capacities of ACS pellets were found to increase as the pellets became smaller and to increase with increasing the total pore volume of the pellet. Results show that 90% or more of sulfur removal can be obtained with up to 40% sorbent utilization. It was found that, with the distributor plate of 0.03 to 0.04 inch hole size, 20 to 50 mesh particle size is the largest pellet size which can be fluidized reasonably well at a gas velocity of over 2 ft/sec. The sulfation rates measured under different process conditions show that: the reaction rate increases proportionally with SO sub 2 concentration in the gas stream up to 0.35%; the reaction rate decreases linearly with an increase in the sulfur loading of the pellet and the reaction rate increases with temperature in an Arrhenius fashion in the temperature range of 850 to 1050 exp 0 C. (ERA citation 07:047734)

DE82015195 MF **A01**
Hydrocarbon Research, Inc., Lawrenceville, NJ.
H-Coal-Pilot-Plant Startup-Oil Study.
May 82, 48p DOE/ET/10152-77
Contract AC05-77ET10152
Portions of document are illegible.
Available in microfiche only.

This bench-unit program simulated the Catlettsburg H-Coal Pilot Plant start-up procedure in Run 6, which used catalytic cracker slurry oil, an aromatic petroleum oil. The program was designed to explore the reasons for Pilot Plant operational difficulties which included reactor product instability, vacuum pumping difficulties and unexpected product yields. Startup oil, hydroclone overflow and withdrawn catalyst were obtained from the Pilot Plant for use in this run with Illinois No. 6 coal. In this run the ratio of startup oil/coal was varied in Periods 1-10, from 2 to 0.2, while the ratio of recycle oil to coal was increased from 0 to 1.8. Recycle oils generated during this run were used as slurry oils in Periods 11 and 12. Initially, the C sub 4 -975 exp 0 F total distillate yield was 57.4 W %. As the startup oil feed was eliminated later in the run, the C sub 4 -974 exp 0 F yield fell to 45.4 W %. Ancillary studies were performed on separator bottoms in order to establish their viscosity and settling characteristics as a function of time. Viscosity measurements were also made on bottoms containing 1 to 30 W % 975 exp 0 F exp - distillate. For comparison, viscosities were measured as a function of temperature using PDU Run 5 hydroclone overflow samples which were vacuum distilled to contain < 33 W % 975 exp 0 F distillate. The propensity toward carbon formation was investigated by a series of Ramsbottom carbon residue (RCR) measurements on separator bottoms which covered the range of startup oil/coal ratios from 2 to 0. Finally, microautoclave tests were performed on startup oil and hydroclone overflow oils in order to assess their ability to dissolve coal.

DE82015236 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
International Survey of the Status of Technology of Critical Components for Coal-Liquefaction Processes.
W. R. Williams, T. B. Conley, T. L. Dahl, and K. O. Johnsson. Jun 82, 78p ORNL/ENG/TM-24
Contract W-7405-ENG-26
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Microfiche only after original copies are exhausted.

The subject survey considers three categories of components: slurry letdown valves, slurry pumps, and heat-transfer equipment (slurry preheaters and exchangers and gasifier waste-heat boilers). We concluded that foreign technology is similar to US technology and that both foreign and domestic manufacturers are hindered by: (1) a lack of adequate design correlations partially because of proprietary restrictions; and (2) uncertainties in demonstration and commercialization schedules. Solutions to slurry letdown valve and slurry pump problems, which are only now being developed in the United States, were used as far back as the 1940s in German liquefaction plants and today are being incorporated into equipment selected and installed in several foreign pilot plants.

DE82015480 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Catalytic Effects in Coal Gasification. Quarterly Report, April-June 1981.
T. D. Padrick, and D. E. Trudell. Apr 82, 18p SAND-82-0791
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

This quarterly report, for the period April through June 1981, summarizes the activities of Sandia National Laboratories' program on mineral matter effects in coal gasification. The objective of this program is to develop a fundamental understanding of the mechanism of the catalytic effects of mineral matter in coal gasification, and to use this knowledge for future process improvements. Experiments using various catalyst dispersion techniques indicate that for a given iron compound, improved dispersion results in improved catalytic activity. We observed that the addition of inert or catalytically active minerals eliminated agglomeration in the Bruceton coal. We also determined that addition of the iron catalyst increases the surface area and shifts and pore sizes, but the magnitude of the effect varies greatly from one compound to another. Results presented indicate that the mechanism for catalytic enhancement of hydrogasification is similar for the various iron compounds and that differences in activity can be correlated with the number of active Fe sites. We have begun a series of experiments to study the degree of H sub 2 /D sub 2 exchange over various reduced iron catalyst to assess their relative activity towards hydrogen transfer. (ERA citation 07:045566)

DE82015597 PC **A07**/MF **A01**
Versar, Inc., Springfield, VA.

Regeneration of FGD Dry-Sorbent Materials. Phase I. Final Report.
A. J. Kapsalopoulou, D. H. Sargent, and E. F. Rissman. May 82, 143p DOE/FC/10179-2
Contract AC18-80FC10179
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Sodium-based sorbent injection directly into the flue gas duct of a coal-burning power plant has been investigated since 1975 by GFETC (using laboratory and pilot plant apparatus) as an SO sub 2 control technology. Regeneration of sorbent from spent sorbent material is highly desirable to reduce the sorbent cost, and to alleviate the leaching and potential pollution problems of soluble sodium compounds when disposing of spent sorbent materials in landfills. The work reported herein was initiated to develop a continuous, aqueous-based process for regeneration of sodium carbonate-type sorbents from spent sodium-base sorbent/flyash materials. Specific project objectives are to: (1) retain process simplicity and to avoid difficult process conditions; (2) maximize recovery of sodium from spent sorbents; (3) minimize process costs and energy requirements; (4) maximize reactivity of the regenerated sodium bicarbonate sorbent; and (5) produce process waste materials that may be disposed of in an environmental acceptable manner. The sorbent regeneration process which has been developed during the laboratory investigation (Phase I) of this project may be divided into three parts: (1) leaching of the spent sodium-based sorbent; (2) conversion of the leachate to a NaCl brine; and (3) production of NaHCO sub 3 (regenerated sorbent) using commercially-proven Solvay (ammonia-soda) process technology. Significant results from the laboratory study are as given.

DE82900729 MF **A01**
Handelsbolaget Nordisk Fluidbaeddfoergasning (Sweden).
Fast Fluid Bed Coal Gasification for Conversion of Existing Oil-Fired Boilers - the Agglomeration of Ash with the Separation in the Venturi Tube.
Jun 79, 88p NE/KOL-80-2(Pt.1)
In Swedish.Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

The report deals with experiments in a fluidized bed of coal powder. The separation of agglomerates of ash has been made in a venturi tube. The work has been performed at the H. Ahlstroem laboratory in Karhula, Finland. The separation of agglomerates in the venturi tube with the diameter of 47.8 mm went well and the proportion of ash in outgoing dust was 95 to 99.5% at 9 kg/h. The percentage of ash in the fluidized bed was high, 55 to 70%, which rendered a high bed temperature, 15 to 40degC below the softening point of the ash. A literature survey covering the melting properties of ash is presented. (ERA citation 07:042091)

DE82903515 MF **A01**
Tennessee Valley Authority, Muscle Shoals, AL.
Economic Evaluation and Comparison of Alternative Limestone-Scrubbing Options.
T. A. Burnett, R. L. Torstrick, and F. A. Sudhoff.
1982, 25p TVA/OP/EDT-82/35, CONF-820551-1
EPA/EPRI symposium on flue gas desulfurization, Hollywood, FL, USA, 17 May 1982, Portions of document are illegible.
Available in microfiche only.

The preliminary-grade economics (accuracy: -15%, +30%) of various alternative limestone scrubbing options (absorber type, with and without forced oxidation, and with and without adipic acid enhancement) are examined using the current design and economic premises established for the continuing series of economic evaluations performed by TVA for EPA. The economics are projected using the Shawnee lime/limestone computer model, which is based on long-term operating data from the EPA Alkali Scrubbing Test Facility at the TVA Shawnee Steam Plant near Paducah, Kentucky. The capital investment for the base-case limestone scrubbing process (500 MW, 3.5% sulfur coal, 1979 NSPS, spray tower, forced oxidation, landfill) is $206/kW. The first-year and levelized annual revenue requirements are 10.59 and 15.09 mills/kWh respectively. Costs for the equivalent limestone scrubbing process using a Turbulent Contact Absorber (TCA) are lower while those for the venturi - spray tower absorber are higher. The forced-oxidation landfill disposal option has a lower capital investment than the unoxidized pond disposal option for all cases studied; however, the first-year and levelized annual revenue requirements are slightly higher for the forced-oxidation landfill process for most coal applications. For the spray tower limestone process to achieve a specified SO sub 2 removal efficiency, it is more economical to increase the limestone stoichiometry and minimize the absorber L/G. The use of adipic acid or possibly dibasic acid (DBA) as an additive to enhance SO sub 2 removal in the limestone scrubbing process is an economically attractive option. The use of adipic acid remains economically attractive even if both a high unit cost and a high degradation factor for adpic acid are assumbed.

PB83-851048 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fermentation Processes. June, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 89p
Supersedes PB80-852593.

This bibliography contains citations concerning fermentation techniques, enzymes and enzyme technology used in the production of alcohols and other products. Continuous fermentation processes and the application of computer technology to fermentation control are discussed. (This updated bibliography contains 79 citations, 30 of which are new entries to the previous edition.)

PB83-851709 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Catalytic Cracking. June, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 215p
Supersedes PB80-857287.

This bibliography contains citations concerning applications of catalytic cracking in fluidized beds, moving beds, refineries, vacuum distillations, reformers and other processes. Design criteria, models, controls, and operating procedures are also discussed. (This updated bibliography contains 209 citations, 101 of which are new entries to the previous edition.)

7C. Organic Chemistry

AD-A119 655/9 PC **A02**/MF **A01**
Texas A and M Univ., College Station. Dept. of Chemistry.
Macrocycles Containing Tin. Two Syntheses of 1,1,6,6,11,11,16,16-Octaphenyl-1,6,11,16-Tetrastannacycloeicosane and a Synthesis of 1,1,6,6-Tetraphenyl-1,6-Distannacyclodecane.
Technical rept.,
Martin Newcomb, Yutaka Azuma, and Arleen R. Courtney. 22 Sep 82, 12p Rept no. TR-3
Contract N00014-79-C-0584

Synthetic techniques and methods for analysis and purification of macrocycles containing tin atoms are exemplified by the title syntheses. Highlights of the syntheses include a highly selective conversion of 1,4-bis-(triphenylstannyl)butane to 1,4-bis-(bromodiphenylstannyl)butane and a two component macrocyclization which proceeds in 43% yield to give the 20-membered ring product. Analytical HPLC and preparative chromatography methods for characterization and purification of the macrocycles and their synthetic intermediates and analogs are described. Other syntheses which show the generality of the methods are discussed. (Author)

AD-A119 671/6 Not available NTIS
Utah Univ., Salt Lake City. Dept. of Chemistry.
Preparation and Characterization of (Microns-Dichloroboryl)Pentaborane(9).
Mansel A. Nelson, Mitsuaki Kameda, Steven A. Snow, and Goji Kodama. 5 Jan 82, 4p ARO-18151.3-CH
Contract DAAG29-81-K-0101
Availability: Pub. in Inorganic Chemistry, v21 n7 p2898-2900 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 685/6 Not available NTIS
Kansas State Univ., Manhattan. Dept. of Chemistry.
Unusual Cycloaddition Reactions with 2-(Trifluoromethyl)-3,3-Difluorooxaziridine,
William Y. Lam, and Darryl D. DesMarteau. 11 Mar 82, 3p ARO-17108.7-CH
Contract DAAG29-80-C-0102
Availability: Pub. in Jnl. of American Chemical Society, v104 n14 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 721/9 PC **A02**/MF **A01**
Ohio State Univ., Columbus. Dept. of Chemistry.
Studies on the Syntheses of Boron Hydride Systems.
Final rept. 1 Jul 81-31 May 82,
Sheldon G. Shore. 30 Jul 82, 10p ARO-15611.11-CH
Contract DAAG29-81-C-0029
See also report dated 20 Nov 81, AD-A115 817.

Syntheses of the new anion (BH3C1), B2H6, B10H14, and 2-BrB4H9 are discussed. The use of B5H9 as a starting point in the preparation of B9H13L, B10H12L2 and nido-5,6-RR'C2B8H10 is described. (Author)

AD-A119 808/4 PC **A03**/MF **A01**
Gulf Research and Development Co., Pittsburgh, PA.
Low Cost Aromatic Acetylene and Oligomeric Benzils and Their Conversion to Acetylene Terminated Quinoxalines.
Final rept. 10 Apr 81-31 Mar 82,
E. T. Sabourin. Jul 82, 47p AFWAL-TR-82-4068
Contract F33615-81-C-5016

A novel oligormeric acetylene terminated quinoxaline composition was prepared in a five step reaction sequence starting from m-dibromobenzene and acetylene. The new material showed a Tg of about 65 degrees. Removal of catalytic amounts of palladium and copper used in the preparation was found to be very difficult. A 50 gram sample of the new resin was prepared and submitted to AFWAL/MLBP for evaluation. Research efforts to catalytically replace chlorine atoms in chloroaromatics by acetylene groups were unsuccessful. A study was made of the effect of temperature and pressure on the preparation of 4,4'-bis(3-bromophenoxyl)phenylsulfone. (Author)

DE82012300 PC **A02**/MF **A01**
Union Carbide Corp., Oak Ridge, TN. Nuclear Div.
Characterization of Polymers and Polymeric Components by LC/MS Using Direct Liquid Inlet (DLI) Interface.
D. C. Canada, and D. S. Zingg. 24 Mar 82, 3p K/TL/AT-125AE, CONF-820630-1
Contract W-7405-ENG-26
30. annual conference on mass spectrometry and allied topics, Honolulu, HI, USA, 6 Jun 1982.

Application of DLI LC/MS techniques to the identification and characterization of non-volatile polymeric ethers is reported. Oligomers of polyphenyl ethers, esterified polyethlene glycols, polysilyl ethers, and the diglycidyl ether of Bisphenol A (DGEBA) have been characterized by these methods. In addition to the expected molecular weight information, some of these polymeric ethers have enough excess internal energy to fragment after ionization supplying useful structural information. This work was done with a Hewlett-Packard 5985B mass spectrometer interfaced to a Hewlett-Packard 1084B liquid chromatograph. An unmodified, 1/2-in. O.D. DLI interface was employed for sample addition. CH sub 3 CN/H sub 2 0 solvent mixtures were used to affect separation of individual oligomers on reverse-phase (RP-8) LC columns. (ERA citation 07:047558)

PAT-APPL-6-332 701 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
New Polymers as Carriers for Transition Metals.
Patent Application,
H. R. Allcock, T. J. Fuller, and T. L. Evans. Filed 21 Dec 81, 21p AD-D009 710/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Synthesis of new (lithiophenoxy)phosphazene high polymers is described wherein such as poly(dichlorophosphazene) are used as the starting material to prepare poly(organophosphazenes) by reaction thereof with sodium para-bromophenoxide. Poly(organophophazenes) thus obtained are used in a

metal-halogen exchange reaction with n-butyllithium. The lithio derivatives thus obtained are used as reactive intermediates for the synthesis of polymers of formulas (NP(OC6H4X-p)x(OC6H4Br)y)n and (NP(OC6H4Li-p)x(O Ph)y)n, where X is PPh2, PPh2C4H9+Br-, SnPh3, AuPPh3, or COOH. (Author)

PAT-APPL-6-378 167 PC **A02/MF A01**
Department of the Navy, Washington, DC.
An Improved Synthesis of 3-Hydroxyoxetane.
Patent Application,
Phillip T. Berkowitz. Filed 14 May 82, 19p AD-D009 716/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The object of this invention to provide a new method of synthesizing 3-hydroxyoxetane. Another object of this invention is to provide a more efficient method of producing 3-hydroxyoxetane. A further object of this invention is to provide a simpler method of producing 3-hydroxyoxetane. Another object of this invention is to reduce or eliminate the need for working up or purifying intermediate products in the production of 3-hydroxyoxetane.

PAT-APPL-6-383 421 PC **A02/MF A01**
Department of the Navy, Washington, DC.
An Improved Preparation of Bis(Azidomethyl) Oxetane.
Patent Application,
Milton B. Frankel, and Edgar R. Wilson. Filed 1 Jun 82, 9p AD-D009 717/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The object of this invention is to provide an improved method of producing 3,3-bis (azidomethyl) oxetane. Another object of this invention is to provide a safer method of producing 3,3-bis (azidomethyl) oxetane. A further object of this invention is to provide a more economical method of producing 3,3-bis (azidomethyl) oxetane.

PAT-APPL-6-388 049 PC **A02/MF A01**
Department of the Navy, Washington, DC.
Synthesis and Polymerization of 3-Azidooxetane.
Patent Application,
Phillip T. Berkowitz. Filed 14 Jun 82, 12p AD-D009 718/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to polethers and more particularly to energetic polyethers containing azido groups. It is, therefore, an object of the present invention to provide a new organic azido compound. Another object of this invention is to provide a method of synthesizing a new organic azido compound. A further object of the present invention to provide a propellant binder with excellent mechanical properties and a high energy content.

PAT-APPL-6-391 901 PC **A02/MF A01**
Department of the Navy, Washington, DC.
New Plasticizer for Nitropolymers.
Patent Application,
George W. Naufleet, and Robert C. Gill. Filed 25 Jun 82, 11p AD-D009 713/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A novel composition of matter comprising a mixture of a nitrocellulose polymer and a plasticizer comprising dimethylmethylene dinitramine. (Author)

PAT-APPL-6-394 084 PC **A02/MF A01**
Department of the Navy, Washington, DC.
Improved Method for the Preparation of Methylnitramine.
Patent Application,
George W. Naufleet. Filed 1 Jul 82, 12p AD-D009 712/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention is an improved process for the production of methylnitramine by nitrating dimethylurea with a mixture of sulfuric acid and nitric acid with subsequent separation of 1,3 dimethyl-1,3 dinitro urea by the use of a suitable solvent with recovery of a dimethyl dinitrourea in organic solvent, with hydrolysis of the dimethyldinitrourea with hot water to yield methylnitramine. (Author)

PATENT-3 657 190 Not available NTIS
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Method for Forming Pyrrone Molding Powders and Products of Said Method.
Patent,
C. T. Hughes, and R. J. McHenry. Filed 17 Nov 69, patented 18 Apr 72, 6p N82-29358/0, PAT-APPL-877 445
Supersedes PAT-APPL-877 445-69.Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

The formation of pyrrone resins of the ladder or semi-ladder structure is described. The technique involves initial formation of fully cyclized prepolymers having an average degree of polymerization of about 1.5, one with acidic terminal groups, another with amine terminal groups. Thereafter the prepolymers are intimately admixed on a 1:1 stoichiometric basis. The resulting powder mixture is molded at elevated pressures and temperatures to form a fully cyclized resin.

7D. Physical Chemistry

AD-A119 433/1 Not available NTIS
Defence Research Establishment Ottawa (Ontario).
The Kinetics and Mechanism of the Electroreduction of Sulfur Dioxide in Nonaqueous Media. I. Reduction in Solutions of Tetraethylammonium Perchlorate in N,N-Dimethylformamide,
C. L. Gardner, D. T. Fouchard, and W. R. Fawcett. 24 Sep 80, 9p Rept no. DREO-848
See also Part 2, AD-A119 434.
Availability: Pub. in Jnl. of the Electrochemical Society, v128 n11 p2337-2345 Nov 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 434/9 Not available NTIS
Defence Research Establishment Ottawa (Ontario).
The Kinetics and Mechanism of the Electroreduction of Sulfur Dioxide in Nonaqueous Media. II. Effects of Electrolyte and Solvent on the Mechanism of Reduction,
C. L. Gardner, D. T. Fouchard, and W. R. Fawcett. 9 Feb 81, 6p Rept no. DREO-849
See also Part 1, AD-A119 433.
Availability: Pub. in Jnl. of the Electrochemical Society, v128 n11 p2345-2350 Nov 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 494/3 PC **A04/MF A01**
Aerospace Corp., El Segundo, CA. Materials Sciences Lab.
Calibration of a Mass Spectrometer for Analysis of Ultramicro Gas Samples Using a Dynamic Method of Analysis.
Technical rept.,
Wendell M. Graven, and Donald E. Gilmartin. 16 Aug 82, 56p TR-0082(2935-03)-3, SD-TR-82-55
Contract F04701-81-C-0082

A special-purpose mass spectrometer was allocated to analyze very small amounts of residual gases in electronic devices, principally traveling wave tubes. Because of device-related constraints that made it necessary to transport ultramicro amounts of gas to the analyzer, a dynamic method of analysis was adopted. Using calibrated leak sources, reliable transport and reproducible analyses of ultramicro amounts of gases were demonstrated with seven gases over a four-decade range. For inert gases, the reproducible analytical range extended below 10 to the -11th power atm/cu cm. Extensive calibrations were carried out with eight gases by using both the residual gas analyzer and the ionization gauge as detection instruments. These data, as well as the results of residual gas analyses conducted with production-quality traveling wave tubes, have validated the dynamic method of analysis. (Author)

AD-A119 508/0 PC **A02/MF A01**
Massachusetts Univ., Amherst. Astronomy Research Facility.
The 5g Levels of Atomic Nitrogen,
Edward S. Chang, and Hajime Sakai. 27 Feb 81, 6p AFGL-TR-82-0268
Contracts F19628-81-K-0007, F19628-76-C-0087
Pub. in Jnl. of Physics, B, Atomic and Molecular Physics, v14 pL391-L395 1981.

No abstract available.

AD-A119 588/2 PC **A02/MF A01**
New York Univ., NY. Dept. of Physics.
Collision Kernels and Laser Spectroscopy,
P. R. Berman. 1982, 1p
Contract N0014-77-C-0553
Pub. in Applied Physics, v28B. Laser Spectroscopy, p190 1982.

No abstract available.

AD-A119 589/0 PC **A02/MF A01**
New York Univ., NY. Dept. of Physics.
Semiclassical Picture of Depolarizing Collisions: Application to Collisional Studies Using Laser Spectroscopy,
J.-L. Le Gouet, and P. R. Berman. 2 Apr 81, 15p
Contract N00014-77-C-0553
Pub. in Physical Review A, v24 n4 p1831-1844 Oct 81. Errata sheet inserted. Prepared in cooperation with Centre National de la Recherche Scientifique, Orsay-Cedex (France). Laboratoire Aume Cotton.

No abstract available.

AD-A119 590/8 PC **A02/MF A01**
New York Univ., NY. Dept. of Physics.
Noble Gas Induced Relaxation of the Li 3S-SP Transition Spanning the Short Term Impact Regime to the Long Term Asymptotic Regime,
T. W. Mossberg, R. Kachru, T. J. Chen, S. R. Hartmann, and P. R. Berman. 1981, 4p
Contract N00014-77-C-0553
Pub. in Laser Spectroscopy V p208-211 1981. Prepared in cooperation with Columbia Radiation Lab., Contracts N00014-78-C-0517 and DAAG29-79-C-0079.

No abstract available.

AD-A119 638/5 Not available NTIS
Minnesota Univ., Minneapolis. Dept. of Chemistry.
Effective Symmetry of a Lattice of Molecules Adsorbed on a Substrate Lattice,
Henry Nichols, and Robert M. Hexter. 22 Dec 81, 17p ARO-16665.4-CH
Contract DAAG29-80-C-0017
Availability: Pub. in Surface Science, v118 p597-612 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 647/6 PC **A02/MF A01**
Cornell Univ., Ithaca, NY. Dept. of Chemistry.
Secondary Ion Mass Spectrometric Image Depth Profile Analysis of Thin Layers.
Interim technical rept.,
George H. Morrison, P. K. Chu, and William C. Harris, Jr. 22 Sep 82, 24p Rept no. TR-9
Contract N00014-80-C-0538

Image depth profiling is applied to the quantitative analysis of molecular beam epitaxially grown gallium arsenide thin layers. The technique involves the use of ion implantation through a mask and subsequent analysis by secondary ion mass spectrometry (SIMS). The proposed approach provides high accuracy results in the analysis of semiconductor thin layers. (Author)

AD-A119 666/6 Not available NTIS
Stanford Univ., CA. Stanford Electronics Labs.

Photoemission and Photon-Stimulated Ion Desorption Studies of Diamond(111): Hydrogen,
B. B. Pate, M. H. Hecht, C. Binns, I. Lindau, and W. E. Spicer. 1 Feb 82, 5p ARO-18679.1-PH
Contract DAAG29-82-K-0087, Grant DAAG29-78-G-0130
Availability: Pub. in Jnl. of Vacuum Science and Technology, v21 n2 p364-367 Jul/Aug 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 667/4 Not available NTIS
Rensselaer Polytechnic Inst., Troy, NY. Dept. of Mathematical Sciences.
Some Analytic Results Concerning the Accuracy of the Continuous Approximation in a Polymerization Problem,
Meira S. Falkovitz, and Lee A. Segel. 5 Mar 81, 8p ARO-16753.8-MA
Contract DAAG29-79-C-0146
Availability: Pub. in SIAM Jnl. of Applied Mathematics, v42 n3 p542-548 Jun 82.

No abstract available.

AD-A119 669/0 Not available NTIS
San Diego State Univ., CA. Dept. of Chemistry.
Electronic Effects on Triplet and Singlet Excited-State Carbonyl Formation in the Thermolysis of 3-Aryl-3-Methyl-1,2-Dioxetanes,
William H. Richardson, and Diana L. Stiggall-Estberg. 21 Sep 81, 8p ARO-17283.4-CH
Contract DAAG29-80-K-0021
Availability: Pub. in Jnl. of the American Chemical Society, v104 n15 p4173-4179 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 670/8 Not available NTIS
Indiana Univ. at Bloomington. Dept. of Chemistry.
Observation of Polyatomic Ion Vibrational State Distribution by Laser Photoelectron Spectroscopy,
Jon T. Meek, S. Randolph Long, and James P. Reilly. 26 Apr 82, 4p ARO-17997.1-CH
Contract DAAG29-81-K-0097, Grant EPA-R-808790
Availability: Pub. in Jnl. of Physical Chemistry, v86 n15 p2809-2811 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 688/0 PC **A08/MF A01**
New York Univ., NY. Dept. of Physics.
Theoretical Studies Relating to the Interaction of Radiation with Matter: Atomic Collision Processes Occurring in the Presence of Radiation Fields.
Annual rept. no. 5, 1 Aug 81-31 Jul 82,
P. R. Berman. 15 Sep 82, 158p
Contract N00014-77-C-0553

Work is reported in the areas of: (1) Two-level Atom and Radiation Pulse, (2) Effects of Collisions on Atomic Coherences, (3) Collision Effects in Degenerate-Four-Wave-Mixing, (4) Laser-Assisted Collisions, (5) Laser Spectroscopy of Na, and (6) Heating of a Vapor via Laser Assisted Collisions. (Author)

AD-A119 697/1 Not available NTIS
Illinois Univ. at Urbana-Champaign. Dept. of Geology.
Chemical Osmosis, Reverse Chemical Osmosis, and the Origin of Subsurface Brines,
Donald L. Graf. 30 Jul 81, 19p ARO-16743.2-GS
Contract DAAG29-80-C-0068
Availability: Pub. in Geochimica et Cosmochimica Acta, v46 p1431-1448 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 722/7 PC **A02/MF A01**
Pennsylvania Univ., Philadelphia.
Mechanism of Insertion in Highly Conducting Graphite Intercalation Compounds.
Final rept. 1 Sep 78-1 Nov 81,
F. Lincoln Vogel, William C. Forsman, Kam Leong, and Theodore Dziemianowicz. 1 Nov 81, 4p ARO-13169.4-MS, ARO-15804.5-MS
Contracts DAAG29-78-C-0037, DAAG29-75-C-0022

Synthesis and properties of graphite intercalation compounds with HNO3, SbF5 and FeCl3 have been studied with an eye toward insertion mechanism and novel highly conducting compounds. Virtually all acceptor type compounds are formed by oxidation reactions initiated at the basal planes. Adducts of NOC1-FeC13 have been shown to be new oxidative intercalants. Electrical properties of graphite nitrate are relatively insensitive to the neutral HNO3 content. (Author)

AD-A119 731/8 PC **A02/MF A01**
Howard Univ., Washington, DC. Dept. of Chemistry.
Laser Irradiation of SV40 DNA.
Technical rept.,
Marian Johnson-Thompson, Joshua B. Halpern, William M. Jackson, and Jay George. 17 Sep 82, 18p Rept no. TR-12-ONR
Contract N00014-80-C-0305
Prepared in cooperation with University of the District of Columbia, Washington. Dept. of Biology and Schools of Medicine and Dentistry, Washington, DC. Dept. of Biochemistry.

Simian virus 40 DNA was irradiated by a high intensity ArF excimer laser. Analysis by gel electrophoresis, neutral sucrose gradient analysis, and alkaline sucrose gradient analysis showed that the laser irradiation leads to breaking of the sugar phosphate backbone in a sequential manner at random sites. The causitive process is either attack by laser generated free radicals or two photon direct scission. (Author)

AD-A119 733/4 PC **A03/MF A01**
Cornell Univ., Ithaca, NY. Baker Lab.
Differential Sputtering Correction for Ion Microscopy Using Image Depth Profiling.
Interim technical rept.,
Adam J. Patkin, Subhash Chandra, and George H. Morrison. 22 Sep 82, 28p Rept no. TR-10
Contract N00014-80-C-0538

A first-order correction for differential sputtering is made to ion micrographs using image depth profiling. This is done by first recording the ion image to be corrected, then sputtering down to the substrate while recording a series of images at the substrates's mass. A time-domain 'burn-through' map showing the time each location of the sample first sputters through to the substrate is then generated. This map is used to make a linear correction for differential sputtering induced ion intensity artifacts to the initial sample images. C(40)+ ion images of a radish root tip steel cell region on a tantalum substrate are corrected in this fashion. Relative sputtering rates of 1.5 and 1.2 compared to the cytoplasm were found for the cell walls and nuclei, respectively. (Author)

AD-A119 742/5 PC **A02/MF A01**
Texas Univ. at Austin. Dept. of Chemistry.
Infrared Studies of CO Adsorption on Reduced and Oxidized Pt/TiO2.
Technical rept. 1 Jan-31 Dec 82,
Katsumi Tanaka, and J. M. White. 17 Aug 82, 23p Rept no. TR-27
Contract N00014-75-C-0922

Carbon monoxide adsorption experiments were studied on reduced and oxidized Pt/Ti02 with Ft-IR. On reduced samples two kinds of linear CO species were observed and assigned as adsorption on Pt close-packed (terrace) sites 1/2094 cm. In addition a bridged CO species was found at 1/1854 cm. Both linear species show increasing frequencies with coverage. Saturation CO uptake decreases with increasing substrate reduction temperature and there is a preferential decrease of linear CO CO species on terrace sites and the concentration of bridged species lies below detection limits. On oxidized Pt/Ti02 samples, some Pt atoms are covered with oxygen atoms and the density of step sites is enhanced. (Author)

AD-A119 749/0 PC **A03/MF A01**
Naval Research Lab., Washington, DC.
Pyrolysis of Organic Compounds Containing Long Unbranched Alkyl Groups.
Final rept.,
George W. Mushrush, and Robert N. Hazlett. 21 Sep 82, 30p Rept no. NRL-8630

The presence of n-alkanes in jet fuel in the right distillation range can be explained if large n-alkanes are present in the crude-oil source. Quantities of large n-alkanes present in crudes made from shale are insufficient, however, to explain the amounts found (up to 37%) in the jet fuel made from these crudes. Although possible precursors to small straight chain molecules are branch alicyclic compounds or substituted cyclic compounds, this report shows that attack in the side chain of model aromatic compounds typically found in shale crudes affords a path to significant yields of n-alkanes. Primary attack at the alpha and gamma positions is favored for substituted benzenes and pyridines. The major initial product distribution can be explained on the basis of Fabuss-Smith-Satterfield theory. (Author)

AD-A119 751/6 PC **A02/MF A01**
Cornell Univ., Ithaca, NY. Dept. of Chemistry.
Solid State Standard Addition Method in Secondary Ion Mass Spectrometry for Improvement of Detection Limits.
Interim technical rept.,
Paul K. Chu, and George H. Morrison. 22 Sep 82, 18p Rept no. TR-8
Contract N00014-80-C-0538

The technique of solid state standard addition is inadequate for the determination of low dopant concentrations present in real semiconductor samples. An extension of the solid state standard addition method using computer controlled signal integration is shown to lower the detection limit of boron in silicon by an order of magnitude. The precision and accuracy of this method were found to be 25% and 12%, respectively. (Author)

AD-A119 760/7 PC **A02/MF A01**
Columbia Radiation Lab. New York.
Relative Noble-Gas-Induced Broadening of the D Lines of Atomic Lithium.
Rept. for 1 Jun 81-31 May 82,
R. Kachru, T. J. Chen, T. W. Mossberg, and S. R. Hartmann. 13 Aug 81, 5p
Contracts N00014-78-C-0517, DAAG29-79-C-0079
Pub. in Physical Review A, v25 n3 p1546-1549 Mar 82.

No abstract available.

AD-A119 772/2 PC **A03/MF A01**
Howard Univ., Washington, DC. Dept. of Chemistry.
Photodissociation Dynamics in a Pulsed Molecular Beam.
Technical rept.,
Richang Lu, J. B. Halpern, and William M. Jackson. 16 Sep 82, 27p Rept no. TR-13-ONR
Contract N00014-80-C-0305

The ArF laser photodissociation of C2N2, C1CN and BrCN have been studied in a pulsed beam. Comparisons are made between these results and the radical product distirbutions measured in an effusive beam. Comparisons are also made between the effects of cooling by expansion in argon and expansion in methane. The later is known to more effectively cool vibrational modes in the parent molecule. (Author)

AD-A119 779/7 PC **A22/MF A01**
Little (Arthur D.), Inc., Cambridge, MA.
Research and Development of Methods for Estimating Physicochemical Properties of Organic Compounds of Environmental Concern. Part 2.
Final rept. May 79-Jun 81 on Phase 2,
Warren J. Lyman, William F. Reehl, and David H. Rosenblatt. Jun 81, 522p Rept no. ADL-C-82426-PT-2
Contract DAMD17-78-C-8073
See also Part 1, AD-A118 754.

This report contains selected, evaluated estimation methods for 26 environmentally important physicochemical properties of organic chemicals. The methods selected are applicable to a variety of chemical classes, are easy to use, require a minimum of input data, and are reasonably accurate. Each method has a descriptive text, step-by-step instructions, worked-out examples, and supplementary information allowing the user to estimate the likely uncertainty of an estimated value. Approximately 800 literature references cited. (Author)

AD-A119 783/8 PC **A02/MF A01**
Aerospace Corp., El Segundo, CA. Space Sciences Lab.

Micrographic Observations of the Carbonaceous Mesophase by a Quenching Hot Stage.
Technical rept.,
Jack L. White, Manfred Buechler, and Cassandra B. Ng. 30 Aug 82, 11p TR-0082(2935-02)-2, SD-TR-82-51
Contract F04701-81-C-0082

A hot-stage microscope with quenching capability was employed to relate the observations made at the free surface of a pitch during pyrolysis to the bulk microstructure. Freshly formed mesophase spherules display an 'iceberg effect' with only a limited upper segment exposed to view. The mesophase layers tend to lie normal to the free surface, and + or - 2 Pi as well as + or - Pi disclinations display discontinuous cores at the free surface; aside from these minor effects, surface observations appear to be representative of events taking place within the bulk mesophase. (Author)

AD-A119 794/6 PC **A02**/MF **A01**
Aerospace Corp., El Segundo, CA. Space Sciences Lab.
The Aerospace Long-Path Multiple Reflection Cell Facility.
Technical rept.,
Kenneth C. Herr, Luis J. Ortega, Richard G. Robbins, Santo S. Durso, and Robert M. Young. 30 Aug 82, 20p TR-0082(2940-03)-1, SD-TR-82-60
Contract F04701-81-C-0082

The Aerospace long-path infrared absorption cell is described. This facility is a multiple-pass modified White cell which can be operated at any temperature between 170 K and room temperature with path lengths from 60 m up to 4 km. The cell itself is an 11-m long double-walled aluminum dewar. The spectral coverage extends from visible to 50 micrometers using as a source either a high temperature blackbody or a tunable diode laser. An internal 20 kV flash photolysis system will permit detection and kinetic studies of transient species. This combination of characteristics makes the system ideally suited to study a wide variety of upper and lower atmospheric phenomena under realistic conditions as well as other phenomena requiring low concentrations or high sensitivity. (Author)

AD-A119 798/7 PC **A05**/MF **A01**
Norwegian Defence Research Establishment, Kjeller.
The Behaviour of Al Electrodes in Aqueous Solutions.
Torstein Valand. Aug 81, 84p Rept no. NDRE/PUBL-81/1003
Revision of report dated Apr 77, AD-B031 268.

In this work the behaviour of oxide covered A1 electrodes in aqueous solutions is treated. Emphasis is laid on the behaviour at low electrode potentials, ie below approximately -1.0V(SCE). Based on the general theories of passivation developed by KJ Vetter, a thermodynamic treatment of the electrode is reported. Results obtained from experiments with pure and alloyed A1 are given. Usually, the potential step technique was used in these experiments, but other techniques, such as capacity measurements, were also applied. These results are discussed in the light of the thermodynamic treatment, especially when the ion transfer and the oxide formation process is considered. The cathodic hydrogen evolution reaction has been treated by assuming that the step involving electron transfer is rate determining. The effects of oxide thickness and alloying elements on the hydrogen evolution reaction are discussed in accordance with this assumption. In this connection, the effect of separate phases formed on the electrode surface by alloying elements is also discussed. (Author)

DE82001343 MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Characteristics of Fly Ash from Laboratory Combustion of Pulverized Coal.
G. Parsons, P. Sherman, R. Greif, and F. Robben. Sep 81, 22p LBL-13022, CONF-820403-1
Contract W-7405-ENG-48
Spring meeting of the Western States Section of the Combustion Institute, Salt Lake City, UT, USA, 12 Apr 1982, Portions of document are illegible.
Available in microfiche only.

Submicron particles generated from pulverized coal combustion show an enrichment of certain trace elements that may be a health hazard when ingested into the lung. Sieved pulverized coal was entrained in an air/methane/oxygen mixture and burned in an enclosed bunsen type burner fitted with a chimney. Cold secondary air was injected at the chimney exit. The fly ash samples were separated into two size categories (diameter < 2.5 mu and 2.5 mu < diameter < 15 mu) and analyzed by x-ray fluorescence. Results show enrichment of several volatile elements in the small size fraction compared to the large size fraction. There is also indication of depletion of some refractory elements. The results support suggestions of several earlier observations which were made on full scale modern boilers. (ERA citation 07:049164)

DE82002463 PC **A04**/MF **A01**
Aerodyne Research, Inc., Bedford, MA.
Homogeneous Production and Removal of NO/sub X/ from Combustion Exhaust Flows. Final Technical Report, August 1, 1980-July 31, 1981.
J. A. Silver. Oct 81, 52p ARI-RR-275
Contract AC21-80MC14737

The addition of ammonia to the exhaust stream of stationary combustors is a promising approach toward reducing NO/sub x/ emissions. The use of high sulfur-content fuels will produce moderate quantities of SO aNd other sulfur-bearing compounds which may affect the effectiveness of this thermal deNO/sub x/ process. Modeling efforts"iNdicate that the presence of SO sub 2 is slightly beneficial in removing NO above 1250K. Experiments show that the ammonia-like species (NH/sub i/, i=1,2,3) have no appreciable reaction rate with SO sub 2 . However, the reactions of SO sub 2 with OH and SO sub 3 with H have a small effect on the chemistry. A chemical model which fully describes the deNO/sub x/ process and the effects of SO sub 2 is presented. (ERA citation 07:049079)

DE82008354 MF **A01**
Oregon Univ., Eugene. Inst. of Theoretical Science.
Synchrotron Radiation to Be Used to Generate Holographic X-Ray Gratings.
P. L. Csonka, and R. Tatchyn. 1981, 5p DOE/ER/70004-302
Contract AT06-76ER70004
Portions of document are illegible. MN only. Microfiche copies only.

The synchrotron radiation generated by high electrons circulating in storage rings may be used to produce holographic x-ray gratings of up to about 5 x 10 exp 4 lines per millimeter. Such gratings could then be employed as elements in x-ray optics. They could also serve to test recording resolution of various surfaces, to study narrow strips of monolayers, to investigate Block oscillations, to observe the fine structure of Landau levels as well as in the construction of artificial crystals. (ERA citation 07:051944)

DE82008615 PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Gamma-Ray Measurements for Simultaneous Calorimetric Assay.
D. A. Rakel. 2 Mar 82, 10p MLM-2898
Contract AC04-76DP00053

Gamma-ray measurements obtained in the course of developing a simultaneous calorimetric assay system are described. Gamma-ray measurements of the isotopic composition of six, well-characterized plutonium oxide samples were obtained while the samples were in the calorimeter. These samples represent a range of plutonium masses from 19 to 231 g and two isotopic compositions. The values of effective specific power determined from the gamma-ray measurements agree with the values determined from destructive assay. (ERA citation 07:054571)

DE82008827 MF **A01**
Texas A and M Univ., College Station. Dept. of Physics.
Learning from Numerical Calculations of Ion-Atom Collisions.
J. F. Reading, A. L. Ford, M. Martir, and R. L. Becker. 1981, 33p CONF-8103120-1
Contract W-7405-ENG-26
International workshop of light ion-atom collisions, Linz, Austria, 11 Mar 1981.
Available in microfiche only.

Violent collision of two independent many-particle systems, victims, are discussed in the atomic sphere. The asymmetric region where the charge of the projectile Z/sub p/ is less than the target nuclear charge Z/sub n/ is now well understood though interesting details still need to be worked out. Negatively charged projectiles offer a new illustration of Fadeev re-arrangement collisions. Multi-electron coherence effects illustrate the richness of the field but a symmetric (Z/sub p/ approx. Z/sub n/) collision treatment is needed. A new one and a half center expansion method promises a solution to this problem. Future areas of interest are discussed. (ERA citation 07:044895)

DE82008834 MF **A01**
Oak Ridge National Lab., TN.
Multiphoton Ionization of Atoms and Molecules.
R. N. Compton, and J. C. Miller. 1982, 13p CONF-820336-1
Contract W-7405-ENG-26
Optical Society of America topical meeting on laser techniques for extreme ultraviolet spectroscopy, Boulder, CO, USA, 8 Mar 1982, Portions of document are illegible.
Available in microfiche only.

We have studied resonantly enhanced multiphoton ionization of alkali atoms, rare gases, and small molecules using tightly focused dye laser beams (power densities of 10 exp 9 to 10 exp 11 W/cm exp 2). The gas densities for most species were varied over the range from 10 exp -7 torr to approx. 100 torr. In the case of alkali atoms, some ionization signals appear as a result of gas density effects (dimers or quasi-collisions) as previously discovered by Collins and his collaborators. These have been termed hybrid-resonances. By contrast, in the case of the rare gases, certain resonance ionization signals disappear with increasing gas density. At low pressure (10 exp -7 to 10 exp -5 torr) we have studied (1) mass spectra, (2) kinetic energy released in ionic fragmentation, and (3) photoelectron kinetic energy spectra using time-of-flight mass analysis and a 160 exp 0 spherical sector electrostatic energy analyzer. These experiments, combined with two-color dye laser experiments, can offer an unambiguous and detailed description of the multiphoton ionization and subsequent fragmentation events. (ERA citation 07:044892)

DE82009881 MF **A01**
Brookhaven National Lab., Upton, NY.
Prolegomena to Studies of Gas-Aqueous Reactions in Clouds.
S. E. Schwartz. Feb 82, 5p BNL-30982, CONF-820529-2
Contract AC02-76CH00016
Symposium on the composition of the nonurban troposphere, Williamsburg, VA, USA, 25 May 1982, Portions of document are illegible.
Microfiche copies only.

The incorporation of gaseous materials by cloud liquid water has been widely invoked as a significant process in removal of these substances from the atmosphere and in acidification of precipitation. Such a process in general involves mass transport in the gas and aqueous phases, physical dissolution of the reactive gas, and chemical reaction. This paper reviews some general concepts pertinent to the rate and extent of such reactions. Consideration of these concepts is useful in evaluating rates of in-cloud reactions and in the design and interpretation of field measurements. (ERA citation 07:044634)

DE82011151 MF **A01**
North Carolina State Univ. at Raleigh.
Scrption of Graphites at High Temperatures. Final Report, February 1, 1977-June 30, 1978.
N. I. Kazi, T. D. Pyecha, and L. R. Zumwalt. 30 Jun 80, 152p DOE/EV/04682-4
Contract AS05-76EV04682
Portions of document are illegible.
Available in microfiche only.

This report include: (1) corrected data and new data on cesium sorption by bulk graphite (H-451) with a discussion of anomalies and a comparison of the data; (2) a review of the exponential (Freundlich) isotherm theory and a derivation of the modified-exponential isotherm; (3) a report on a study by the pseudo-isopiestic method of cesium by H-451 graphite powder (size range 44 to 74 mu m) of the type used in the Knudsen cell mass spectrometer method; (4) a comparison of the results on particulate graphite (powder) obtained by the Knudsen cell method and also a comparison of cesium sorption results obtained with the bulk graphite; (5) development of a theory for the kinetics of sorption of a system (cesium and graphite) which shows an exponential (Freundlich) type of sorption; (6) comparison of theoretical with observed kinetics for sorption of cesium by graphite (H-451) powder and a comparison

of bulk graphite vs. particulate graphite sorption kinetics; (7) report of a study of the effects of barium on cesium sorption by H-451 graphite at 1000 exp 0 C; and (8) a thermodynamic treatment of mixed sorption and its application to mixed barium-cesium and strontium-cesium sorption by graphite. (ERA citation 07:042138)

DE82011596 MF **A01**
Virginia Univ., Charlottesville. Dept. of Physics.
Spectroscopy of Surface-Adsorbed Molecules. Progress Report, May 1, 1981 to April 30, 1982.
R. V. Coleman. 1982, 38p DOE/ER/05776-9
Contract AS05-78ER05776
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Status of the following projects is reported: ESCA spectra of surface-adsorbed aromatics containing NO sub 2 groups; ESCA chemical shifts observed on different oxide substrates; studies of Inelastic Electron Tunneling Spectroscopy (IETS) intensities; IETS barrier structure and barrier models; and electrode effects of IETS. (ERA citation 07:048639)

DE82011720 MF **A01**
Wisconsin Univ.-Madison.
Polarized Negative Ions.
W. Haeberli. Apr 81, 11p DOE/ER/40010-941, CONF-810468-11
Contract AC02-81ER40010
International conference on electrostatic accelerator technology, Oak Ridge, TN, USA, 13 Apr 1981.
Available in microfiche only.

This paper presents a survey of methods, commonly in use or under development, to produce beams of polarized negative ions for injection into accelerators. A short summary recalls how the hyperfine interaction is used to obtain nuclear polarization in beams of atoms. Atomic-beam sources for light ions are discussed. If the best presently known techniques are incorporated in all stages of the source, polarized H exp - and D exp - beams in excess of 10 mu A can probably be achieved. Production of polarized ions from fast (keV) beams of polarized atoms is treated separately for atoms in the H(25) excited state (Lamb-Shift source) and atoms in the H(1S) ground state. The negative ion beam from Lamb-Shift sources has reached a plateau just above 1 mu A, but this beam current is adequate for many applications and the somewhat lower beam current is compensated by other desirable characteristics. Sources using fast polarized ground state atoms are in a stage of intense development. The next sections summarize production of polarized heavy ions by the atomic beam method, which is well established, and by optical pumping, which has recently been demonstrated to yield very large nuclear polarization. A short discussion of proposed ion sources for polarized exp 3 He exp - ions is followed by some concluding remarks. (ERA citation 07:051943)

DE82012180 MF **A01**
Valence Adjustment of Plutonium(III) By Electrolytic Oxidation.
O. Zhang. 1981, 12p ORNL-tr-4826
Contract W-7405-ENG-26
A , Heh Hua Hsueh Yu Fang She Hua Hsueh, 3 n2 P123-128 1981.Portions of document are illegible.
Available in microfiche only.

The electrolytic oxidation of hydrazine, U(IV), and Pu(II) has been studied in HNO sub 3 medium using the controlled potential technique. The anode is made of platinized titanium. The results obtained indicate that the overpotential of oxygen evolution in nitric acid solution is lower by about 200 mV than that in perchloric acid solution. The hydrazine and Pu(II) are oxidized readily. Besides, the oxidation rate for hydrazine increases with flow velocity and decreases with increase in HNO sub 3 concentration apparently, whereas the oxidation of Pu(IV) and U(IV) requires a large overpotential. By the electrolysis of 43 ml of the synthetic 1BP solution containing 0.011 M Pu(II)-0.0015 M U(IV)-0.133 M N sub 2 H sub 5+ -1.71 M HNO sub 3 at a potential of 900 to 1300 mV vs SCE for 60 min, the oxidation of hydrazine, U(IV), and Pu(II) in the solution is almost complete. (ERA citation 07:047606)

DE82012764 PC **A02**/MF **A01**
Southern Illinois Univ. at Carbondale.
Metallic Glasses as New Catalyst Systems for Energy Conversion. Annual Progress Report.
W. E. Brower, Jr., and G. V. Smith. 1981, 5p DOE/ER/10897-1
Contract AC02-81ER10897

Metallic glasses of Pd-Si and Pd-Ge alloys have been made and characterized. Their catalytic activity is different from crystalline catalysts and seems to correlate with incipient crystallinity in the glasses. A Fe-B glass was prepared and its catalytic activity was similar to that found by other investigators. A Ni-Au extended solid solution was prepared with the Rh lattice parameter. This material, however, did not exhibit catalytic properties of Rh but, rather, of Ni. This result disagrees with the Horiuti-Polyanyi theory of catalytic hydrogenation. (ERA citation 07:044292)

DE82013340 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Analytical Chemistry Division. Annual Progress Report for Period Ending December 31, 1981.
W. S. Lyon. Apr 82, 86p ORNL-5873
Contract W-7405-ENG-26
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The functions of the Analytical Chemistry Division fall into three general categories: (1) analytical research, development, and implementation; (2) programmatic research, development and utilization; (3) technical support. The Division is organized into five major sections each of which may carry out any type of work falling into the thre categories mentioned above. Chapters 1 through 5 of this report highlight progress within the five sections which are: analytical methodology; mass and emission spectrometry; analytical technical support; bio/organic analysis section; and nuclear and radiochemical analysis. A short summary introduces each chapter to indicate work scope. Information about quality assurance and safety programs is presented in Chapter 6, along with a tabulation of analyses rendered. Chapter 7 covers supplementary activities. Chapter 8 is on presentation of research results (publications, articles reviewed or referred for periodicals). Approximately 56 articles, 31 proceedings publications and 33 reports have been published, and 119 oral presentations given during this reporting period. (ERA citation 07:044270)

DE82013556 PC **A02**/MF **A01**
Columbia Univ., New York. Dept. of Chemistry.
Progress Report, April 1, 1981 to March 31, 1982.
1982, 4p DOE/ER/10756-2
Contract AC02-80ER10756

Our experiments on chemical reactions might be described by a laser specialist as pump and probe experiments. The pump process is a photodissociation and the probe process is a laser induced fluorescence (LIF). Both these processes would be somewhat limited if they were confined to one photon excitations. For example, to probe vibrationally and rotationally excited CO molecules one can conveniently use Bernheim's technique of exciting the A' pi reverse arrow X' sigma transition in CO by a two photon absorption process. We have verified that we can probe CO by LIF at pressures of only a few millitorr. (ERA citation 07:044901)

DE82013653 PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Oxygen Diffusion of Anodic Surface Oxide Film on Titanium Studied by Auger Electron Spectroscopy.
P. S. Wang, T. N. Wittberg, and R. G. Keil. 1982, 16p MLM-2934, CONF-820710-1
Contract AC04-76DP00053
International pyrotechnics symposium, Steamboat Springs, CO, USA, 12 Jul 1982.

TiO sub 2 films of about 1000 A were grown onto titanium foils anodically under galvanostatic conditions at 20 mA/cm exp 2 in saturated aqueous solutions of ammonium tetraborate. The samples were then aged at 450, 500, and 550 exp 0 C, and oxygen diffusion was observed by Auger electron spectroscopy (AES) profilings. The oxygen diffusivities were calculated by Fick's Second Law, using the Boltzmann-Matano solution, to be 9.4 x 10 exp -17 , 2.6 x 10 exp -16 , and 1.2 x 10 exp -15 cm exp 2 /sec at 450, 500, and 550 exp 0 C, respectively. The diffusivities obtained by this method were also compared with those obtained using an exact solution to Fick's Second Law. The activation energy was calculated to be 30 kcal/mole.

DE82900700 MF **A01**
National Swedish Environment Protection Board, Stockholm.
Long Range Aerosol Transport of Metals and Sulfur.
H. Lannefors, and J. W. Winchester. Nov 80, 104p SNV-PM-1337, CONF-8006203-
Workshop on long range aerosol transport of metals and sulfur, Lund, Sweden, 13 Jun 1980, Portions of document are illegible.
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The report deals with the summaries of the lectures given at the workshop. Research results related to heavy metal transport from pollution sources through the atmosphere were reviewed. The ability of analytical methods such as particle induced X-ray emission to detect heavy metals as well as aerosol sulfur are discussed in the report. (ERA citation 07:044659)

DE82902316 MF **A01**
GKSS - Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.)
Sensitive Detection of Hydrogen Chloride by Derivative Spectroscopy with a Diode Laser.
P. Pokrowsky, and W. Herrmann. 1981, 10p GKSS-81/E/23
Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

The method of derivative spectroscopy has been used for the detection of HC1 in the atomsphere, using a tunable diode laser as light source. The system was field tested on board of a research vessel. In these tests, a detection sensitivity of 100 ppb sqrt Hz was achieved. (ERA citation 07:044645)

DE82902463 MF **A01**
Democritus Nuclear Research Center, Athens (Greece).
Metal Concentration in the Air of a Suburb of Athens.
V. Katselis, and T. Paradellis. Nov 81, 9p DEMO-81/11
Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

Photon induced x-ray fluorescence is used to detect trace elements with 20 less than or equal to Z less than or equal to 40 in airborne particulates collected on filters papers near an industry in a suburb of Athens. (ERA citation 07:044637)

DE82902785 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Connection Between Chemical Rate Coefficients and Two-Particle Correlation Functions in Aggregated Systems.
S. Vass. Sep 80, 14p KFKI-1980-120
U.S. Sales Only.

The forward direction rate coefficient lambda of irreversible biomolecular reaction A + B implies C is expressed in terms of the average velocities and of the spatial correlation of reactants. The anisotropic conditions supposed in microaggregates result in a formula differing from that in isotropic liquids. This difference ensures a conceptual possibility to explain the deviation of rate coefficients observed in microaggregates from those observed in conventional solutions. (ERA citation 07:044283)

DE82902862 PC **A02**/MF **A01**
Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil).
Determination of Thorium in Concentrates by X-Ray Fluorescence.
I. M. Sato, and K. Imakuma. Nov 81, 14p IPEN-Pub-36
In Spanish.
U.S. Sales Only.

A method for the determination of thorium by x-ray fluorescence technique in concentrates obtained from monazite sand is outlined. The fusion-dilution method is used for the sample preparation. The sample in the original form is mixed with a fusion flux. After fusion of the mixture a pellet with smooth surface is obtained. No chemical separation procedure is necessary. The intensity of the ThL alpha line is used for the calculation of the thorium content in the sample with the aid of the double dilution method. A good reproducibility is observed for the thorium determination in the concen-

trate; the precision observed is of the order of +- 1.85%. (ERA citation 07:044256)

DE82902867 MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil). Centro de Operacao e Utilizacao do Reator de Pesquisas.
Determination of the Isotopic Abundance of exp 235 U in Rocks in Search for an Oklo Phenomenon in Brazil by Activation Analysis.
M. B. A. Vasconcellos, M. J. A. Armelin, R. Fulfaro, and F. W. Lima. Sep 81, 15p IPEN-Pub-33
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Isotopic analyses of uranium are generally carried out by mass spectrometry, with a precision better than 1%. In nuclear laboratories it is often necessary to perform rapid determinations of exp 235 U isotopic abundances. Thermal neutron activation analysis by delayed neutron counting or by high resolution gamma-ray spectrometry can be applied for this purpose, although with less precision than by mass spectrometry. In this work, delayed neutron counting and gamma-ray spectrometry were used for the determination of the isotopic abundance of exp 235 U in rocks from the Northeastern region of Brazil. In the case of the application of delayed neutron counting, the rocks were analyzed non-destructively. When high resolution gamma-ray spectrometry was applied, a pre-irradiation chemical separation had to be performed, by extraction of uranium with tributylphosphate. By both methods employed the results for the isotopic abundance of exp 235 U can be considered as equal to the natural value of 0.702%, for the rocks under study. The precision attained by gamma-ray spectrometry was better than that by delayed neutron counting. (ERA citation 07:044255)

DE82902872 MF **A01**
Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil).
Characterization and Thermal Decomposition of Uranium Compounds by Thermogravimetry and Differential Exploratory Calorimetry.
J. M. Dantas, and A. Abrao. Apr 81, 20p IPEN-Pub-21, CONF-8010269-2
In Spanish.21. Brazilian congress of chemistry, Porto Alegre, Brazil, 21 Oct 1980, Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

This paper is a contribution to the characterization of several uranium compounds obtained at the IPEN Uranium Pilot Plant. Particularly, samples of ammonium diuranate (ADU) and uranium oxides were studied. The main objective was to know the stoichiometry of the ADU and the oxides resulted from its thermal transformation. ADU samples were prepared by batchwise precipitation, stationary dewatering into stove and batchwise thermal decomposition, or, alternatively, continuous precipitation, continuous filtration, continuous drying and continuous thermal decomposition inside a temperature gradient electrical furnace. All ADU were precipitated using NH sub 3 gas from uranyl sulfate or uranyl nitrate solutions. The thermal decomposition of ADU and uranium oxides were studied in an air atmosphere by thermogravimetry (TG) and differential scanning calorimetry (DSC). Any correlation between the parameters of precipitation, drying, calcination and the history of the obtaination of the several uranium compounds and their initial and final composition was looked for. Heating program was established to have the U sub 3 O sub 8 oxide as the final product. Intermediary phases were tentatively identified. Temperatures at which occurred the absorption water elimination, crystallization water elimination, evolution or oxidation of NH sub 3 , decomposition of NO sub 3- ion and oxygen evolution and the exo- and endothermic process for each sample were identified. (ERA citation 07:044312)

DE82902878 MF **A01**
Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil).
Production of Elementary Fluorine at IPEN. Present Situation in Brazil and Future Prospects.
A. Abrao, A. Ikuta, F. M. Wirkner, and F. P. da Silva. Apr 81, 15p IPEN-Inf-6, CONF-8010269-5
In Portuguese.21. Brazilian congress of chemistry, Porto Alegre, Brazil, 21 Oct 1980, Portions of document are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

This paper describes the construction, installation and operation of a pilot for electrolytic generation of elemental fluorine. The 400 A monel electrolytic cell is heated by a water jacket. The electrolyte has the composition KF.1,8 to 2,0 HF that is maintained by intermittent addition of gaseous HF. Pre-electrolysis is made using nickel anodes which are then exchanged by nongraphitized carbon ones. Systems for purification of elemental fluorine by cryoscopy and absorption of HF, compression and storage for fluorine are described. Pure fluorine is used for the preparation of uranium hexafluoride. Identification of problems and difficulties and their solution are pointed out. (ERA citation 07:044281)

N82-31463/4 PC **A03**/MF **A01**
GKSS - Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.). Inst. fuer Werkstofftechnologie und Chemie.
Filtration Techniques for Reversed Osmosis.
K. H. Reinhardt, and H. J. Mueller. 1980, 32p DE82-902292, GKSS-80/E-37
Text in German.

Filtration techniques for reverse osmosis pretreatment systems and methods for mathematical modeling and testing of filters as well as for determining concentration and particle size distribution of suspended solids are reviewed. The sensitivity of turbidity measurements can be increased by compensating for stray light which originates from the cuvette walls so that very low contents of suspended solids can be measured as accurately as by the silt density index method. The latter, however, is better suited for predicting membrane behavior.

N82-31476/6 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Cadarache, Saint-Paul-les-Durance (France). Dept. des Reacteurs a Neutrons Rapides.
Granulometric Study of Sodium Aerosols by Laser Spectroscopy.
J. P. Baldassari. Dec 80, 47p CEA-CONF-5260
Text in French. Presented at the Cea-Gkae Semina: Technol. Of Fast Neutron Reactors, Cadarache, France, 12-21 Dec. 1978.

The theoretical background, the experimental procedures, and the results of the in situ method for measuring sodium aerosol granulometry are discussed. This laser spectroscopy technique utilizes the correlation functions of light intensity fluctuations caused by the Brownian motion of sodium aerosols to determine aerosol granulometry and diffusion coefficient. The PAVANA test rig was used to conduct experiments with sodium aerosols at temperatures ranging from 100 C to 300 C and 360 l/hr flowrate, average diameter and dispersion factor found to be 3 microns and 0.37 respectively.

N82-31727/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Mount St. Helens Aerosol Evolution.
V. R. Oberbeck, N. H. Farlow, W. Fong, K. G. Snetsinger, and G. V. Ferry. Aug 82, 15p NAS 1.15:84265, A-8981, NASA-TM-84265

Stratospheric aerosol samples were collected using a wire impactor during the year following the eruption of Mount St. Helens. Analysis of samples shows that aerosol volume increased for 6 months due to gas-to-particle conversion and then decreased to background levels in the following 6 months.

N82-32088/8 PC **A02**/MF **A01**
SRI International, Menlo Park, CA. Molecular Physics Lab.
Quantitative Absorption and Fluorescence Study of CO from 1060 to 1550 a.
L. C. Lee, and J. A. Guest. 2 Jun 80, 15p NAS 1.26:169292, NASA-CR-169292
Contract NASW-3270

Measurement of the photoabsorption cross section of CO in the 1060-1550 A region using synchrotron radiation is described. The oscillator strengths for the transitions from CO (Chi1Sigma+ to various excited states are obtained from these data. Fluorescence from excited CO was observed in the 1150 to 3000 A and 3000 to 8000 A regions. The quantum yields for the production of fluorescence from the Alpha(1)P and B(1)Sigma(+) states are unity because their excitation energies are below the dissociation limit. The C(1)Sigma(+) , v = O level has significant fluorescence quantum yields both in the UV and visible region, but the yields for the E(1)Pi, v = O and C(1)Sigma(+), v = 1 levels are very small. The C(1)Sigma(+), v = 1 level is presumably predissociated. The cross sections for the production of fluorescence from the a'(3)Sigma(+), d(3)Delta sub 1, e(3)Sigma(-) yields a(3)Pi, and B(1)Sigma(+), C(1)Sigma(+) yields A(1)Pi transitions upon excitation from the X(1)Sigma(+) were measured.

N82-32177/9 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Section d'Etude des Solides Irradies.
Irradiation Induced Disorder in Organic Conductors.
L. Zuppiroli, and S. Bouffard. Aug 80, 9p CEA-CONF-5434
Presented at the Intern. Conf. On Low Dimensional Synthetic Metals, Helsingor, Denmark, 10-15 Aug. 1980.

Experimental results concerning the transport properties of irradiated 1-D conductors are surveyed. The mechanisms which account for the changes in the dc conductivity either at high or low temperatures are considered. These mechanisms are: the 1-D blocking effects of defects and subsequent transverse fixed range phonon activated hopping of single electrons in the metallic regime, and the charge density waves pinning either in the metallic or the insulating regime. The difficulty between disordered systems and intrinsic or so-called pure ones is demonstrated.

N82-32187/8 PC **A13**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Thermodynamic and Transport Combustion Properties of Hydrocarbons with Air. Part 2: Compositions Corresponding to Kelvin Temperature Schedules in Part 1.
S. Gordon. Jul 82, 281p NAS 1.60:1907, E-947, NASA-TP-1907

The equilibrium compositions that correspond to the thermodynamic and transport combustion properties for a wide range of conditions for the reaction of hydrocarbons with air are presented. Initially 55 gaseous species and 3 coin condensed species were considered in the calculations. Only 17 of these 55 gaseous species had equilibrium mole fractions greater than 0.000005 for any of the conditions studied and therefore these were the only ones retained in the final tables.

N82-32189/4 PC **A18**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Thermodynamic and Transport Combustion Properties of Hydrocarbons with Air. Part 4: Compositions Corresponding to Rankine Temperature Schedules in Part 3.
S. Gordon. Jul 82, 281p NAS 1.60:1909, E-949, NASA-TP-1909

The equilibrium compositions corresponding to the thermodynamic and transport combustion properties for a wide range of conditions for the reaction of hydrocarbons with air are presented. The compositions presented correspond to Rankine temperature schedules.

PAT-APPL-6-364 062 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
A Pyrolysis-Mass Spectrometry Approach to Organic Marine Chemistry Using Chemical Ionization.
Patent Application,
Adam Zsolnay. Filed 31 Mar 82, 11p AD-D009 723/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This report describes a pyrolysis-mass spectrometry approach to organic marine chemistry uses chemical ionization. A small marine sample is dried, and then pyrolized at different incremental temperatures. The resulting pyrolyzates are swept into a mass spectrometer operating under chemical ionization conditions.

PAT-APPL-6-364 290 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.

Supercritical CO2 Extraction of Lipids from Lipid-Containing Materials.
Patent Application,
John P. Friedrich. Filed 1 Apr 82, 15p PB83-101493
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

It is an object of the invention to provide an efficient and economical method for both the extraction and fractionation of lipids by means of a SC-CO2 solvent. The lipid-containing materials contemplated for defatting by the method of the invention include any material which exists in or which can be converted to a physical state that is permeable to the carbon dioxide under supercritical conditions, and in which the lipid therein is a fat or oil predominantly composed of a triglyceride.

PATENT-3 442 674 Not available NTIS
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Aqueous Alkali Metal Hydroxide Insoluble Cellulose Ether Membrane.
Patent,
H. E. Hoyt, and H. L. Pfluger. Filed 6 Apr 65, patented 6 May 69, 3p N82-29370/5, PAT-APPL-446 071
Supersedes PAT-APPL-446 071-65.Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A membrane that is insoluble in an aqueous alkali metal hydroxide medium is described. The membrane is a resin which is a water-soluble C2-C4 hydroxyalkyl cellulose ether polymer and an insolubilizing agent for controlled water sorption, a dialytic and electrodialytic membrane. It is particularly useful as a separator between electrodes or plates in an alkaline storage battery.

PATENT-4 331 746 Not available NTIS
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Advanced Inorganic Separators for Alkaline Batteries.
Patent,
D. W. Sheibley. Filed 27 Feb 81, patented 25 May 82, 5p N82-29708/6, PAT-APPL-6-238 790
Supersedes PAT-APPL-6-238 790, N81-22466 (19 - 13, p 1777).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A flexible, porous battery separator comprising a coating applied to a porous, flexible substrate is described. The coating comprises: (1) a thermoplastic rubber-based resin which is insoluble and unreactive in the alkaline electrolyte; (2) a polar organic plasticizer which is reactive with the alkaline electrolyte to produce a reaction product which contains a hydroxyl group and/or a carboxylic acid group; and (3) a mixture of polar particulate filler materials which are unreactive with the electrolyte, the mixture comprising at least one first filler material having a surface area of greater than 25 meters sq/gram, at least one second filler material having a surface area of 10 to 25 sq meters/gram, wherein the volume of the mixture of filler materials is less than 45% of the total volume of the fillers and the binder, the filler surface area per gram of binder is about 20 to 60 sq meters/gram, and the amount of plasticizer is sufficient to coat each filler particle. A method of forming the battery separator is also described.

PB83-101501 CP **T02**
Environmental Sciences Research Lab., Research Triangle Park, NC.
Data File of UNC Outdoor Chamber Study.
Data file,
Marcia C. Dodge, and Harvey E. Jeffries. 1982, mag tape EPA/DF-82/013
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The smog chamber facility of the University of North Carolina was used in a study to collect experimental data for developing and testing kinetic mechanisms of photochemical smog formation. In this study, 115 dual all-day experiments were conducted using NOx and a variety of organic species. Measurements as a function of time were obtained for hydrocarbons, selected oxygenates, CO, PAN, HNO3, organic nitrates, NO, NO2, O3, total solar radiation, ultraviolet, dew point and temperature. All data obtained in the study are stored on the computer magnetic tape and are suitable for use in developing and testing kinetic mechanisms of photochemical smog formation.

PB83-110148 PC **A15/MF A01**
National Materials Advisory Board (NRC), Washington, DC.
Classification of Gases, Liquids, and Volatile Solids Relative to Explosion-Proof Electrical Equipment.
Final rept.
Aug 82, 347p NMAB-353-5
Contracts DOL-J-9-F-5-0070, PHS-NIOSH-210-78-0120
See also PB82-263153.

This report covers the classification of some 1500 gases, liquids, and highly volatile solids into groups according to Article 500 of the National Electrical Code. It represents considerable expansion of an earlier National Materials Advisory Board report (NMAB 353-1).

PB83-851394 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Particle Collection. June, 1974-October, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-Oct 82.
Oct 82, 62p
Supersedes PB80-852197.Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

This bibliography contains citations concerning the design and applications of particle collection devices, equipment, and methodology. Types of particles discussed include dust, magnetic, nuclear and radioactive particles. Spaceborne applications and performance evaluations are included. (This updated bibliography contains 50 citations, 28 of which are new entries to the previous edition.)

PB83-851790 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Catalytic Recombination of Hydrogen and Oxygen. June, 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for Jun 76-Oct 82.
Oct 82, 146p
Supersedes PB82-857780.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning the recombination of hydrogen and oxygen in the presence of a catalyst. The techniques are important in the operation of fuel cells and in the recombining of gaseous wastes, such as in batteries and from off-gases from nuclear reactors and industrial combustion processes. Some of the abstracts are references to studies on reaction kinetics and effectiveness of various catalysts, without regard to end use. In some reported studies, the oxygen or hydrogen is in the form of a compound, such as carbon monoxide or hydrogen sulfide. (This updated bibliography contains 139 citations, 14 of which are new entries to the previous edition.)

7E. Radio and Radiation Chemistry

DE82004192 MF **A01**
California Univ., Davis.
Eleventh IHAC Symposium.
1982, 166p CONF-820607-(Absts.)
Contract AM03-76SF00034
11. IHAC symposium, Davis, CA, USA, 27 Jun 1982, Portions of document are illegible.
Available in microfiche only.

Abstracts of papers for the 11th International Hot Atom chemistry Symposia are presented in this volume. These are grouped under the following sessions: nuclear chemistry and solid-state hot atom chemistry I; inorganic and solid-state hot atom chemistry II; positronium, mu-meson, and recoil tritium chemistry; kinetic theory of energetic chemical reactions; astrochemistry; inorganic and solid-state hot atom chemistry III; chemistry of energetic atoms; and target chemistry and synthesis I. (ERA citation 07:047601)

DE82011039 PC **A07/MF A01**
Brookhaven National Lab., Upton, NY.
Fifth DOE Solar Photochemistry Research Conference: Proceedings.
1981, 134p BNL-51475, CONF-8105151-Absts.
Contract AC02-76CH00016
DOE solar photochemistry research conference, Upton, NJ, USA, 27 May 1981.
Microfiche only after original copies are exhausted.

This year's meeting dealt largely with the subject of artificial photosynthesis and covered about half of our solar photoconversion research program. The purpose of the meeting is to bring together the contractors of the Division of Chemical Sciences working in this area of research and a few representatives of other program divisions and allow them to exchange ideas and discuss progress on problems of mutual interest. They also give interested government officials a picture of the state of development of the field. This volume contains the program of the meeting, the list of attendees, the abstracts of the talks and posters and a record of the discussion following each oral presentation. Individual abstracts and poster sessions have been title listed for inclusion in the Energy Data Base. (ERA citation 07:046182)

DE82014681 PC **A04/MF A01**
Notre Dame Univ., IN. Radiation Lab.
Radiation Labortory Quarterly Report, January 1, 1982-March 31, 1982.
15 Apr 82, 53p NDRL-2342
Contract AC02-76ER00038

Summaries are presented of 37 reports which were issued during this period and which were submitted for either publication or presentation. Thirty-eight summaries of research in progress are also presented. Photochemistry and radiolysis of various compounds were studied.

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

AD-A119 807/6 PC **A03/MF A01**
Naval Oceanography Command, NSTL Station, MS.
A Prototype Bioluminescence Photometer.
Technical rept.,
Mark L. Geiger. Feb 82, 37p Rept no. NOO-TR-280

This document describes the NAVOCEANO Bioluminescence Photometer System, a vertically-lowered device that records flashes of light produced when small bioluminescent marine organisms are pumped into a turbulent flow regime chamber where they are viewed by a photomultiplier tube. The history and performance of this device are documented in this report. The combined results of experience at sea and engineering performance evaluations suggest that: (1) The present instrument is a useful tool for mapping dinoflagellate bioluminescence capabilities within the upper ocean. (2) A recent modification (based on a twelve-conductor set of winch slip rings) allowed continous profiles of dinoflagellate light production to be recorded without significant decreases in sensitivity or signal degradation by noise. (3) The present instrument is not useful for underway work or for measuring light pro-

duced by organisms of approximately 400 microns in length and larger (thus excluding the larger copepods and practically all euphausiids, fishes, squids, etc.), and (4) Several improvements can be made on the present device by experimenting with underway systems and with chamber sizes, shapes and flow regimes; by altering rates of pumping, and by deviating from the present chart record counting of flashes to an automated data retrieval system based not on individual organism performance but on the maximally-stimulated bioluminescent light produced within a unit volume of sea water.

N82-31884/1 PC **A04/MF A01**
Jet Propulsion Lab., Pasadena, CA.
Lidar and Acoustics Applications to Ocean Productivity.
D. J. Collins. 1 Jun 82, 73p NAS 1.26:169264, JPL-PUB-82-56, NASA-CR-169264
Contract NAS7-100

The requirements for the submersible, the instrumentation necessary to perform these measurements, and the optical and acoustical technology required to develop the ocean color scanner instrumentation are described. The development of a second generation ocean color scanner produced the need for coincident in situ scientific measurements which examine the primary productivity of the upper ocean on time and space scales which are large compared to the environmental scales. The vertical and horizontal variability of the biota, including the relationship between chlorophyll and primary productivity, the productivity of zooplankton, and the dynamic interaction between phytoplankton and zooplankton, and between these populations and the physical environment are investigated. A towed submersible will be constructed which accommodates both an underwater LIDAR instrument and a multifrequency sonar.

PB83-109926 PC **A04/MF A01**
Minnesota Univ., Minneapolis.
Potential Methods for Influencing the Movements and Distribution of Sea Otters: Assessment of Research Needs.
Final rept.,
Jane M. Packard. Sep 82, 63p MMC-81/13
Contract MM-2079342-3

In order to protect the threatened sea otter (Enhydra lutris) population in California while minimizing the possible adverse effects of sea otters on shell fisheries, the Marine Mammal Commission has recommended a management approach recognizing the need for 'zonal management'. This approach would involve reintroduction of sea otters to 'otter zones' outside the current range while providing for exclusion of sea otters from specified 'non-otter zones'. In order to implement zonal management, it would be necessary to develop methods for limiting sea otter movement into non-otter zones. This report identifies nine methods potentially useful for influencing the movements and distribution of sea otters.

PB83-111328 PC **A03**
Gulf Coast Research Lab., Ocean Springs, MS.
Review of 'Hysterothylacium' and 'Iheringascaris' (Both Previously = 'Thynnascaris' (Nematoda: Anisakidae) from the Northern Gulf of Mexico.
Thomas L. Deardorff, and Robin M. Overstreet. Jan 81, 46p NOAA-81021203
Pub. in Proceedings Biological Society Washington, v93 n4 p1035-1079, 16 Jan 81.

The genus Hysterothylacium Ward and Magath (type-species H. brachyurum Ward and Magath) is resurrected to include those species previously considered as members of the junior synonym Thynnascaris Dollfus and others described in the genus Contracaecum Railliet and Henry that mature in fishes. Iheringascaris Pereira is resurrected for I. inquies (Linton), the senior synonym of I. iheringascaris Pereira. Consequently, the author establish 47 new combinations plus present lists of species that may later be shown to be members of Hysterothylacium. At least six species of Hysterothylacium (H. fortalezae (Klein), H. incurvum (Rudolphi), H. chaunaxi (Olsen), H. reliquens (Norris and Overstreet), H. ogocephali (Olsen), and H corrugatum sp. n.) occur in the Gulf of Mexico, and morphological data and a key are presented for these. Hysterothylacium corrugatum infecting the swordfish from the Atlantic and Pacific oceans can be characterized primarily by having modified prenal annules ventrally in males and tail without ornamentation in conjunction with lacking both deep interlabial grooves and flaring cervical alae.

PB83-112292 PC **A04/MF A01**
Rhode Island Univ., Narragansett. Marine Advisory Service.
A Fisherman's Guide to Echo Sounding and Sonar Equipment: Acoustic Fish Detection Instruments.
Marine bulletin,
Duncan Amos. May 80, 73p URI-MB-41, NOAA-81012605
Grant NA79AA-D-00096

With the high cost of the sophisticated acoustic devices for the detection and capture of fish, the correct specification, installation, and operation of equipment is an absolute requirement to ensure that the fisherman gains maximum benefit, both financially and operationally, from his equipment. This guide provides the fisherman with an understanding of how echo sounders and sonar work, how to specify equipment for his needs, how to ensure its correct installation, how to adjust the equipment correctly, and finally, how to interpret the information presented on the equipment displays.

8C. Dynamic Oceanography

AD-A119 720/1 PC **A06/MF A01**
Illinois Univ. at Urbana-Champaign. Dept. of Physics.
Theoretical Studies of the Oceanic Internal Wave System.
Final rept. 15 Jun 80-30 Jun 82,
Jon Wright. 31 Aug 82, 120p
Contract N00014-80-C-0840

In this paper we apply a formalism introduced in a previous paper to write down a self-consistent set of equations for the functions that describe the near-equilibrium time behavior of random oceanic internal waves. These equations are based on the Direct Interaction Approximation. The self-consistent equations are solved numerically (using the Garrett-Munk spectrum as input) and the results are compared to parameters obtained in the weak interaction approximation (WIA). The formalism points out that an extra parameter that is implicitly vanishingly small in the WIA has a significant effect on decay rates when computed self-consistently. We end by mentioning possible future self-consistent calculations that would improve upon our own. (Author)

N82-31655/5 PC **A03/MF A01**
Waterloopkundig Lab., Delft (Netherlands).
Wave Kinematics and Fluid Loading in Irregular Waves.
J. Bosma, and J. H. Vugts. Nov 81, 32p PUBL-259
Presented at Intern. Symp. On Hydrodyn. In Ocean Eng., Trondheim, Norway, 24-28 Aug. 1981.

The ability of a Gaussian random wave model to describe wave kinematics in a natural sea for engineering applications was investigated. Surface elevation and horizontal and vertical velocities were measured simultaneously in a flume. Nine wave spectra, covering a wide range of sea states, were studied. Measurements and prediction agree well for unidirectional waves, and the influence of directional spreading in multidirectional seas can be accomodated. Model representations of the kinematics in the free surface zone, and predictions of the tails of statistical distributions of surface elevation and velocities must be improved.

PB83-110007 PC **A05/MF A01**
Geological Survey, Albany, NY. Water Resources Div.
Flow Model of the Hudson River Estuary from Albany to New Hamburg, New York.
Water-resources investigations (Final) 1977-81,
David A. Stedfast. 1982, 78p USGS/WRI-81-55, USGS/WRD/WRI/82-068
Prepared in cooperation with New York State Dept. of Environmental Conservation, and New York City Dept. of Environmental Protection.

A one-dimensional transient-flow-simulation model was developed to represent a 76-mile reach of the tidal Hudson River between Albany and New Hamburg. In this reach, the direction of flow reverses four times daily as a result of tidal influence; this produces complex current patterns and retards the rate at which the river can flush out pollutants. In the model, the reach studied is treated as two subreaches to incorporate differences in channel conditions and to simplify model calibration. This report includes all stage (water-level) and discharge data that were used to calibrate and verify the model and compares the model results with measured data. The model can be used to calculate instantaneous stage, velocity, and discharge for any location in the reach and can also be used to calculate net volume flux between tide reversals.

PB83-112268 PC **A17/MF A01**
National Ocean Survey, Rockville, MD.
Tide Tables 1983, High and Low Water Predictions, Central and Western Pacific Ocean and Indian Ocean.
1982, 393p NOAA-82090801
See also PB80-220932.

This edition of the Tide Tables Central and Western Pacific Ocean and Indian Ocean contains full daily predictions for 74 reference stations and differences and other constants for about 1900 stations. It contains also a table for obtaining the approximate height of the tide at any time; a table of local mean time of sunrise and sunset for every fifth day of the year for different latitudes; a table for the reduction of local mean time to standard time; a table for converting feet to meters; a table of the Greenwich mean time of the Moon's phases, apogee, perigee, greatest north and south and zero declination; and the time of the solar equinoxes and solstices and a glossary of terms.

PB83-113332 PC **A08**
Mississippi-Alabama Sea Grant Consortium, Ocean Springs, MS.
Hydrodynamic and Salinity Models for Mobile Bay and East Mississippi Sound.
Master's thesis,
Tien-Feng Tyrone Ling. Dec 81, 170p MASCP-81-020, NOAA-82080611
Grant NA81AA-D-00050
Also pub. as Alabama Univ., University. Bureau of Engineering Research rept. no. BER-283-112. See also PB81-137416.

In this study, the specific interest was to extend the existing mathematical modeling capabilities in Mobile Bay to include the East Mississippi Sound area. A subsystem model for the isolated pass area (Pass aux Herons) was developed by using this extended system model. The improvement results from extending the model from Mobile Bay to East Mississippi Sound where strong interactions are known to occur. The effect of wind direction and speed on Mobile Bay/East Mississippi Sound is demonstrated under various conditions.

PB83-114710 PC **A14/MF A01**
Texas A and M Univ., College Station. Dept. of Oceanography.
The Tsunami Response of the Hawaiian Islands.
Final rept.,
G. T. Hebenstreit, and R. O. Reid. Mar 80, 302p TAMU-REF-80-2-T, NOAA-81020401
Grant NOAA-04-8-022-44008

A linear, long-wave, finite difference model is applied to the Hawaiian Island chain to determine the spectral response at the islands for tsunamis incident from any one of a broad range of directions. The model employs an improved radiational condition for scattered waves. The excitation is in the form of a plane wave form of prescribed direction, but having a broad band spectrum of frequencies or periods typical of the normal range of tsunami events. The island boundaries are modeled as totally reflecting seawalls, with no allowance for non-linear runup, dissipative effects or subgrid scale embayments. The response ascertained in this study reflects the large-scale effects of bathymetry and island configuration, including partial trapping of energy by combined effects of refraction and reflection.

8E. Geodesy

AD-A119 444/8 PC **A02/MF A01**
Naval Surface Weapons Center, Dahlgren, VA.

An Upper Bound on Errors in the Mean-of-Date/ Instantaneous Earth-Fixed Vector Transformation Induced by Interpolated Nutation Angles.
Final rept.,
A. D. Parks. Jun 82, 19p Rept no. NSWC/TR-82-75

An analytic expression for the upper bound on the error induced into a vector modulus by the use of interpolated nutation angles in the coordinate transformation between the mean-of-date reference system and the instantaneous earth-fixed reference system is derived through first order. This expression is applied to the six-point Lagrange interpolator, using interpolation intervals between 0.25 and 1.00 days, and a quantification of associated upper error bounds for earth satellite position vector moduli is made. (Author)

8F. Geography

AD-A119 447/1 PC **A04**/MF **A01**
Coastal Engineering Research Center, Fort Belvoir, VA.
Beach Profile Analysis System (BPAS). Volume I. System Overview.
Technical rept.,
Marilyn V. Fleming, and Allan E. DeWall. Jun 82, 69p Rept no. CERC-TR-82-1-VOL-1
See also Volume 2, AD-A119 448.

This report describes the structure and use of the Beach Profile Analysis System (BPAS), a package of computer programs derived from computer programs developed over several years as part of the Coastal Engineering Research Center (CERC) Beach Evaluation Program (BEP). In the course of the BEP, approximately 20,000 coastal profile line surveys were collected over a 15-year period at 23 localities along the U.S. east coast, gulf coast, west coast, and the coast of Lake Michigan (for background information, see Galvin, 1969). These computer programs were also used to analyze laboratory survey data collected during CERC's Laboratory Effects in Beach Studies (LEBS) project. The BPAS, the primary function of which is to compute and display shoreline and volmetric changes, was designed to analyze beach profile data and laboratory profile data with the objective of obtaining conclusions of value in coastal engineering. Volumes II to VIII are User's Guides.

AD-A119 448/9 PC **A04**/MF **A01**
Coastal Engineering Research Center, Fort Belvoir, VA.
Beach Profile Analysis System (BPAS). Volume II. BPAS User's Guide: The Editing Routines, EDIT1 and EDIT2.
Technical rept.,
Marilyn V. Fleming, and Timothy J. Lawler. Jun 82, 55p Rept no. CERC-TR-82-1-VOL-2
See also Volume 3, AD-A119 449.

This report, provides user instructions for processing programs EDIT1 and EDIT2, a part of the Beach Profile Analysis System (BPAS). The BPAS is a package of computer programs which edit and analyze beach profile data. The EDIT1 program edits the data and the EDIT2 program prepares the data for processing through the anlaysis routines.

AD-A119 449/7 PC **A03**/MF **A01**
Coastal Engineering Research Center, Fort Belvoir, VA.
Beach Profile Analysis System (BPAS). Volume III. BPAS User's Guide: Analysis Module SURVY1.
Technical rept.,
Marilyn V. Fleming, and Timothy J. Lawler. Jun 82, 49p Rept no. CERC-TR-82-1-VOL-3
See also Volume 4, AD-A119 450.

This report, provides user instructions for processing analysis module SURVY1, a part of the Beach Profile Analysis System (BPAS). The BPAS is a package of computer programs which edit and analyze beach profile data. The objective of the analysis is to compute and display changes in unit volume, shoreline position, and a profile geometry. SURVY1 displays beach profile changes, through time, at a locality by providing plots of the actual profile cross sections. Also available is a tabular listing of distance to, and slope of, the profile at the shoreline position.

AD-A119 450/5 PC **A04**/MF **A01**
Coastal Engineering Research Center, Fort Belvoir, VA.
Beach Profile Analysis System (BPAS). Volume IV. BPAS User's Guide: Analysis Module SURVY2.
Technical rept.,
Marilyn V. Fleming, and Timothy J. Lawler. Jun 82, 62p Rept no. CERC-TR-82-1-VOL-4
See also Volume 5, AD-A119 451.

This report provides user instructions for processing analysis module SURVY2, a part of the beach Profile Analysis System (BPAS). The BPAS is a package of computer programs which edit and analyze beach profile data. The objective of the analysis is to compute and display changes in unit volume, shoreline position, and profile geometry. SURVY2 displays beach profile changes, through time, at a locality by providing plots and tables of the changes in distance to selected beach contours. The means of these distances through time at a locality are also computed and displayed, along with linear regression analysis of the change in shoreline position through time.

AD-A119 451/3 PC **A04**/MF **A01**
Coastal Engineering Research Center, Fort Belvoir, VA.
Beach Profile Analysis System (BPAS). Volume V. BPAS User's Guide: Analysis Module BEACH.
Technical rept.,
Marilyn V. Fleming, and Timothy J. Lawler. Jun 82, 66p Rept no. CERC-TR-82-1-VOL-5
See also Volume 6, AD-A119 452.

This report, provides user instructions for processing analysis module BEACH, a part of the Beach Profile Analysis System (BPAS). The BPAS is a package of computer programs which edit and analyze beach profile data. The objective of the analysis is to compute and display changes in unit volume, shoreline position, and a profile geometry. BEACH displays beach profile changes, through time, at a locality by providing tabular and graphical displays of shoreline and unit volume changes. The module also displays the results of linear regression analysis correlating shoreline and unit volume changes with time and with one another.

AD-A119 452/1 PC **A04**/MF **A01**
Coastal Engineering Research Center, Fort Belvoir, VA.
Beach Profile Analysis Systems (BPAS). Volume VI. BPAS User's Guide: Analysis Module VOLCTR.
Technical rept.,
Marilyn V. Fleming, and Timothy J. Lawler. Jun 82, 51p Rept no. CERC-TR-82-1-VOL-6
See also Volume 7, AD-A119 453.

This report, provides user instructions for processing analysis module VOLCTR, a part of the Beach Profile Analysis System (BPAS). The BPAS is a package of computer programs which edit and analyze beach profile data. The objective of the analysis is to compute and display changes in unit volume, shoreline position, and a profile geometry. VOLCTR displays beach profile changes, through time, at a locality by providing plots and tables of unit volume changes between specific contours. Unit volumes within selected contour segments are computed and compared from one survey to the next. Also computed and tabulated are several statistics on unit volume changes between the same surveys at all profile lines.

AD-A119 453/9 PC **A04**/MF **A01**
Coastal Engineering Research Center, Fort Belvoir, VA.
Beach Profile Analysis System (BPAS). Volume VII. BPAS User's Guide: Analysis Module ELVDIS.
Technical rept.,
Marilyn V. Fleming, Timothy J. Lawler, and Diane French. Jun 82, 52p Rept no. CERC-TR-82-1-VOL-7
See also Volume 8, AD-A118 480.

This report, provides user instructions for processing analysis module ELVDIS, a part of the Beach Profile Analysis System (BPAS). The BPAS is a package of computer programs which edit and analyze beach profile data. The objective of the analysis is to compute and display changes in unit volume, shoreline position, and a profile geometry. ELVDIS displays beach profile changes, through time, by providing plots and tables of elevation changes at points on profile lines. Included are the elevations at specific points during each survey and profile envelopes, showing the maximum and minimum points for all surveys.

DE82901245 MF **A01**
Geological Survey, Reston, VA. Water Resources Div.
Wetland Classification System for the Tennessee Valley Region.
Jun 78, 38p NP-2901245
Best available copy from document source. Available in microfiche only.

The wetland classification system described in this note was developed in response to local, state, and federal management needs for wetland information. It is designed to be compatible with the Cowardin (US Fish and Wildlife Service) system and the system developed by Anderson and colleagues for the US Geological Survey, so as to be of maximum use to large numbers of users. Six wetland classes and 12 subclasses, based on water regime and vegetation characteristics, are described for the Tennessee Valley region. (ERA citation 07:044754)

8G. Geology and Mineralogy

DE82008472 MF **A01**
Geological Survey, Reston, VA. Office of Energy Resources.
Shale Characterization and Resource Appraisal of Devonian Black Shales of the Appalachian Basin. Annual Report for Fiscal Year 1981, October 1, 1980-September 30, 1981.
1981, 6p DOE/MC/10866-T14
Contract AI21-79MC10866
Portions of this report are illegible.
Available in microfiche only.

Highlights of accomplishments for the year ending September 30, 1981 are summarized in this report. Research was conducted in the following areas: stratigraphy, geophysics; geochemistry-source bed study; structural studies;conodont maturation-paleontology; data system; geochemistry-trace element study; clay mineralogy; and resource appraisal. The purpose of the study is to characterize the dark-brown to black gas-productive and potentially gas-productive shales and productive shales in the Appalachian region.

DE82012131 MF **A01**
Los Alamos National Lab., NM.
Evaluation of Integrated Data Sets: Four Examples.
S. L. Bolivar, S. B. Freeman, and T. A. Weaver. 1982, 21p LA-UR-82-859, CONF-820146-1
Contract W-7405-ENG-36
Mathematical Geology US symposium, Golden, CO, USA, 27 Jan 1982, Portions of document are illegible. Best available copy from document source. Available in microfiche only.

Several large data sets have been integrated and utilized for rapid evaluation on a reconnaissance scale for the Montrose 1 exp 0 x 2 exp 0 quadrangle, Colorado. The data sets include Landsat imagery, hydrogeochemical and stream sediment analyses, airborne geophysical data, known mineral occurrences, and a geologic map. All data sets were registered to a 179 x 119 rectangular grid and projected onto Universal Transverse Mercator coordinates. A grid resolution of 1 km was used. All possible combinations of three, for most data sets, were examined for general geologic correlations by utilizing a color microfilm output. In addition, gray-level pictures of statistical output, e.g., factor analysis, have been employed to aid evaluations. Examples for the data sets dysprosium-calcium, lead-copper-zinc, and equivalent uranium-uranium in water-uranium in sediment are described with respect to geologic applications, base-metal regimes, and geochemical associations. (ERA citation 07:045473)

DE82012936 MF **A01**
Chicago Univ., IL. Dept. of Geophysical Sciences.
Depth to and Concentrations of Water in Large Bodies of Silicic Magma. Technical Progress Report.
A. T. Anderson, Jr. 1981, 12p DOE/ER/10763-1
Contract AC02-80ER10763
Best available copy from document source. Available in microfiche only.

Large bodies of silicic magma are potential sources of geothermal energy and ore. They also pose threats of catastrophic eruptions. The depths of such bodies are

related to their economic potential and probably to their eruption mechanisms. The concentrations of water in the magmas are important for their eruptive and dynamical behavior and for the development of ores. The concentration of water in melt before ascent and eruption can be measured in inclusions of glass which became trapped in crystals before extrusion. The depth of a magma body can be estimated or delimited if we can find out the concentrations of both carbon dioxide and water in the inclusions of glass. Initial results on the Bishop Tuff of Long Valley Caldera, California yield 4.9 +- 0.5 percent H sub 2 O for glass included in quartz from the Plinian air fall pumice. We estimate a minimum pressure of about 1.3 kb +- 0.2 kb at the top of the body of magma before eruption. Petrographical work on both the Bishop Tuff and the Upper and Lower Bandelier Tuffs of Valles Caldera, New Mexico, suggest that at least the upper parts of all these bodies of silicic magma were saturated with a gas. However, all of the inclusions are devitrified which we find in quartz phenocrysts from even quickly cooled, glassy equivalents of the ignimbritic parts of the tuffs. We do not understand the cause of the devitrification and consider it important to investigate further because of possible significance for the eruption and emplacement mechanisms of ignimbrites, and because inclusions revitrified by laboratory heating may nevertheless yield significant information. (ERA citation 07:044873)

DE82015460 MF **A01**
Sandia National Labs., Albuquerque, NM.
Continuum Description for Jointed Media.
R. K. Thomas. Apr 82, 16p SAND-81-2615
Contract AC04-76DP00789
Portions of document are illegible.
Available in microfiche only.

A general three-dimensional continuum description is presented for a material containing regularly spaced and approximately parallel jointing planes within a representative elementary volume. Constitutive relationships are introduced for linear behavior of the base material and nonlinear normal and shear behavior across jointing planes. Furthermore, a fracture permeability tensor is calculated so that deformation induced alterations to the in-situ values can be measured. Examples for several strain-controlled loading paths are presented.

DE82016062 PC **A02**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Uplift and Subsidence Rates in the Central Columbia Plateau and Their Relation to Siting a Waste Repository at Hanford, Washington.
S. P. Reidel, and K. R. Fecht. May 82, 9p RHO-BW-SA-187P, CONF-820550-5
Contract AC06-77RL01030
Geological Society of American Rocky Mountain section meeting, Bozeman, MT, USA, 7 May 1982.

The Hanford Site is located in the Pasco Basin, one of several structural basins on the Columbia Plateau. The Cold Creek syncline on the Hanford Site is being considered as a potential repository location for the storage of high-level nuclear waste. Important criteria for siting a nuclear waste repository are potentially adverse conditions that could affect the long-term stability of a mined repository. One such condition is structural deformation as it relates to uplift and subsidence in a repository area. The purpose of this talk is to discuss those areas that have undergone uplift and subsidence, with special reference to the Cold Creek syncline, and the rates at which this movement occurred. Also considered is the relation of this movement to siting a nuclear waste repository at Hanford.

NUREG/CR-2909 PC **A04**/MF **A01**
Illinois State Geological Survey Div., Champaign.
Paleozoic Geology of the New Madrid Area,
Technical rept.,
H. R. Schwalb. Mar 82, 70p

This is the final report on the geologic and geophysical study of the New Madrid area by the Illinois State Geological Survey. The area of investigation for this study encompassed portions of eight states within a two hundred mile radius around New Madrid, Missouri. The objectives of the study were to provide a better understanding of the regional structure and tectonics of the New Madrid zone through geologic time by understanding the Paleozoic geology.

N82-31853/6 PC **A02**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Possible Mechanisms Relating Asteroid Impacts to Extinctions and Geomagnetic Reversals Possiveis Mecanismos Que Relacionam O Impacto de Asteroides, as Extincoes E as Inversoes Geomagneticas.
D. J. R. Nordemann. Mar 82, 16p INPE-2340-PRE/085
In Portuguese; English Summary. Sponsored in Part by the Fundo Nacional de Desenvolvimento Cientifico E Technologico (Fndct).

Mechanical processes occurring between the crust and the interior of the Earth, which overcome the difficulty in relating sources of the geomagnetic field dipolar component and shallow asteroid impact effects, and which help to explain some points about the causes of the Earth's magnetic field and its reversals, are discussed.

PB83-109892 PC **A05**/MF **A01**
Texas A and M Univ., College Station. Dept. of Oceanography.
Gas Hydrates in Deep Ocean Sediments.
Annual rept. 1 Apr 81-31 Mar 82,
James M. Brooks Leo A. Barnard, Denis A. Wiesenburg, and Mahlon C. Kennicutt. Jun 82, 99p
Contract GRI-5081-363-0460

The purpose of this research is to elucidate the composition, state, and origin of gas in marine sediments, with particular emphasis on gas hydrates. Gas samples from DSDP/IPOD Site 533 on the Blake Outer Ridge in the Northwest Aatlantic were obtained for molecular and isotopic analyses. Gas samples were collected from the first successful deployment of a pressure core barrel (PCB) in a hydrate region. Two of the four PCB retrievals at in situ pressures suggested the presence of small amounts of gas hydrates. Compositional and isotopic measurements of gases from several points along the pressure decline curve indicated that (1) biogenic methane was the dominant gas (2) little fractionation in C1/C2 ratio or the C1 carbon isotopic composition occurred as gas hydrates decomposed during pressure decline experiments; (3) the percent of C3, i-C4, and CO2 degassed increased as the pressure declined; and (4) excess nitrogen was present during initial degassing. The PCB gas also contained trace amounts of saturated, acyclic, cyclic, and aromatic C5-C14 hydrocarbons, as well as alkenes and tetrahydrothiophenes.

PB83-110593 PC **A04**/MF **A01**
Delaware Univ., Newark. Dept. of Civil Engineering.
Site Selection Study for a Major Trap Experiment: Atlantic Coast of the United States,
R. G. Dean, and O. Borekci. Jan 80, 54p NOAA-81011403

The purpose of this report is to evaluate east coast sites as candidates for a major sediment trap experiment. In addition to twelve east coast sites, one site in the Gulf of Mexico was included. The objective of the trap experiment is, through measurement of the sediment accumulated in the trap and the wave characteristics causing the sand transport, to develop data that will contribute to the quantitative understanding of sediment transport by waves. A particular objective is the development and/or verification of an engineering relationship between longshore sediment transport and wave characteristics.

PB83-111542 PC **A03**/MF **A01**
Stiftelsen Svensk Detonikforskning, Stockholm.
Analysis of Cracks Related to Rock Fragmentation: Part 1 of Lectures at the CISM in Udine, Italy, July 5-9, 1982,
Finn Ouchteriony. 1 Jul 82, 41p DS-1982-4
See also PB83-110908.

This is the first part of notes for five lectures in a course on Rock Fracture Mechanics at the International Centre for Mechanical Sciences (CISM) in Udine in Italy, July 5-9, 1982. The report is mainly a synthesis of previous analytical work but section 3.3, which describes a formal approach to the uniform growth of a star crack, hasn't been published before. Topics covered in this report include the following: Introduction to blasting configurations; Idealized crack systems; Complex representation and conformal mapping; Path - independent integrals.

PB83-851865 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Landslides. 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Oct 82.
Oct 82, 202p
Supersedes PB82-857673.

This bibliography contains citations concerning landslides and their causes, including earthquakes, soil erosion, rock blasting, glaciers and flooding. Studies of landslide prevention are also considered. (This updated bibliography contains 163 citations, 22 of which are new entries to the previous edition.)

PB83-852103 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Rock Mechanics. 1975-October, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Oct 82.
Oct 82, 148p
Supersedes PB82-858614.

This bibliography cites reports which relate to theoretical, experimental, and field investigations and analyses of the mechanical properties and behavior of rocks in general, and of some specific rock types and rock formations in particular. Various types of stress and strain phenomena are considered. (This updated bibliography contains 122 citations, 27 of which are new entries to the previous edition.)

8H. Hydrology and Limnology

AD-A119 723/5 PC **A11**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
The Impact of Climatological Variability on Surface Water Supply in Oklahoma.
Master's thesis,
Charles Christian Olsen. 1982, 231p Rept no. AFIT/CI/NR/82-51T

The frequency and duration of surface water deficits in two river basins in western Oklahoma and the Texas Panhandle are examined for the thirty years, 1951-1980. The studied basins were divided into a total of 10 subbasins. A hydrologic accounting system, using precipitation and temperature as inputs, was used to derive variables such as potential (PET) and actual (ET) evapotranspiration, soil moisture and runoff. These were combined with basic hydrologic variables (stream discharge and lake contents) to calculate long-term weekly mean values and 75 percent empirical ranges for surface water storage and demand. Potential deficit periods were identified and examined using percentage frequency histograms and joint frequency tables. From these it was determined that surface water deficits existed in as many as 47 percent of the thirty years studied. The potential deficit period ranged from 2 weeks to 29 weeks, averaging 17 weeks. Case studies for two of the subbasins for a dry year, a wet year and an 'average' year are presented. Background climatologies for weekly precipitation (30-year means and means for the 5 driest years), weekly stream discharge and weekly lake contents for each of the ten major river basins in Oklahoma are presented.

DE82013518 PC **A03**/MF **A01**
Goodyear Atomic Corp., Piketon, OH.
Portsmouth Gaseous Diffusion Plant Environmental Monitoring Report for Calendar Year 1981.
T. A. Acox, R. E. Anderson, L. F. Hary, L. S. Klein, and A. L. Vausher. Apr 82, 46p GAT-2013
Contract AC05-76OR00001
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At the Portsmouth Gaseous Diffusion Plant all effluent streams are sampled regularly and analyzed to assess compliance with applicable environmental standards. Radioactivity is measured in air, water, food, soil, and sediments; and radiation doses to the public are calculated. All public radiation doses from process effluents are well within Department of Energy and US EPA standards. Non-radioactive effluents either presently comply with federal standards or will comply upon completion of planned projects. The environmental

impact of effluents from cleaning and decontamination operations has been reduced through flow reduction and improved chemical treatment. CY-1981 was the first full year under a new National Pollutant Discharge. Elimination System (NPDES) permit for liquid effluents; compliance with the permit's discharge limits did not present any significant problems. Engineering is proceeding on projects to be constructed through 1985 to further reduce the impact of liquid effluents. A new licensed sanitary landfill utilizing the area fill method went into operation in July 1981. Although neither the State of Ohio nor the federal government has established standards for fluoride in the atmosphere or in vegetation, fluorides are monitored because they are used extensively in the gaseous diffusion process. (ERA citation 07:047990)

DE82015036 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Defining an Optimum Pumping-Time Requirement for Sampling Ground-Water Wells on the Hanford Site.
N. L. Scharnhorst. Apr 82, 37p PNL-4192
Contract AC06-76RL01830

The objective was to determine the optimum time period necessary to pump water from a well before a representative sample of the ground water can be obtained. It was assumed that a representative sample has been collected if the concentration of chemical parameters is the same in a number of samples taken consecutively, so that the concentration of parameters does not vary with time of collection. Ground-water samples used in this project were obtained by pumping selected wells on the Hanford Site. At each well, samples were taken at two minute intervals, and on each sample various chemical analyses were performed. Samples were checked for pH, sulfate, iron, specific conductivity, chloride, nitrate and alkalinity. The data showed that pH, alkalinity, sulfate and specific conductivity levels stabilized almost immediately after pumping of the well began. In many wells, the chloride and nitrate levels were unstable throughout the 38-minute sampling period. Iron levels, however, did not behave in either fashion. The concentration of iron in the samples was high when pumping began but dropped rapidly as pumping continued. The best explanation for this is that iron is flushed from the sides of the casing into the well when pumping begins. After several minutes of pumping, most of the dissolved iron is washed from the well casing and the iron concentration reaches a stable plateau representative of the iron concentration in the ground water.

DE82902321 MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Ground Water Temperatures in Densely Populated Areas.
K. D. Balke, and W. Kley. Feb 81, 91p BMFT-FB-T-81-028
In German.Portions of this report are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

A part of the waste heat resulting from the utilization of energy causes a heat-up of the underground and ground-water. The quantitiy of heat thus stored in the underground of densely populated areas can be recoverd with heat pumps if the energy balance is known. By means of soil and ground-water temperature measurements, the heat flows in the underground of the city of Cologne have been found out. To make out a balance, a computer program was developed for calculating the total of heat storage, the possibilities of energy recovery, and the future ground-water temperatures. In order to reduce thermal anomalies, better insulation of cellars and heating plants, control of infiltration of cooling water, and heat recovery from waste water and the well-considered application of ground-water heat pumps are recommended. (ERA citation 07:044751)

DE82902869 MF **A01**
Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil).
Measurement of Flow and Direction of Ground Water by Rádioactive Tracers: Hydrological Evaluation of a Waste Disposal Site at Instituto de Pesquisas Energeticas E Nucleares (IPEN).
U. Chandra, P. E. Aoki, J. A. Ramos, May 81, 36p IPEN-Pub-28
Portions of document are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

This report describes the method of determining flow and direction of ground water by using radioactive tracers in ground water borings. Various parameters controlling the measurements are discussed in detail. Application of the method in studying variety of geohydrological problems has been indicated. Comparison of the method with conventional pumping tests has been made. The first application of the borehole dilution technique by Centro de Aplicacoes de Radioisotopes e Radiacoes na Engenharia e na Industria (CARRE!) was made to study the movement of ground water around the radioactive waste disposal site at Instituto de Pesquisas Energeticas e Nucleares (IPEN). A study of geohydrological evaluation of the disposal site has been made. Field experiments in the nearest available monitoring well 850 m downstream were made to determine flow and direction of ground water movement. exp 131 I and exp 82 Br were used as radioactive tracers for flow measurements, while exp 51 CrCl sub 3 was used as an absorbing type tracer for determining direction of flow. The field equipment used consisted of gamma scintillation probes, scaler count rate meter, isotope injection assembly and extension rods. Natural gamma log of the well was taken to verify the construction of the borehole and to have an idea of geological stratification at the site. Estimates of velocity of ground water at the waste disposal site were made and therefrom travel times of radioactive nuclides relative to local ground water were computed. The average filtration velocity at 850 m downstream of the waste disposal site has been found to be 3.66 cm/d. The local direction of ground water is towards old Jaguare stream. (ERA citation 07:042593)

PB83-109959 PC **A15**/MF **A01**
Geological Survey, Harrisburg, PA. Water Resources Div.
Water Resources Data for Pennsylvania Water Year 1981. Volume 2. Susquehanna and Potomac River Basins.
Water-data rept. (Annual) 1 Oct 80-30 Sep 81.
Jun 82, 349p USGS-WDR-PA-81-2, USGS/WRD/HD-81/028
See also Volume 2 for water year 1980, PB82-115908.Prepared in cooperation with the State of Pennsylvania and other agencies.

Water resources data for the 1981 water year for Pennsylvania consist of records of discharge and water quality of streams; contents of lakes and reservoirs; and water levels of ground-water wells. This volume contains records for water discharge at 96 stations; contents at 13 lakes and reservoirs; water quality at 39 gaging stations; and water levels at 26 observation wells. Also included are data for 19 crest-stage, and 120 water-quality partial-record stations.

PB83-110072 PC **A03**/MF **A01**
Colorado Div. of Wildlife, Denver.
Studies of the Limnology, Fish Populations, and Fishery of Turquoise Lake, Colorado - 1979-80,
Thomas P. Nesler. Jul 81, 40p REC-ERC-82-5
Contract DI-7-07-83-V0701

Turquoise Lake is one of the primary storage reservoirs in the Fryingpan-Arkansas Water Project and provides supplementary water by conduit to the MT. Elbert Forebay-Twin Lakes system for pump-back storage power generation. The reservoir may be characterized as a dimictic, cold-water lake that is well oxygenated, relatively unbuffed, and slightly acidic. The lake may be classified as oligotrophic on the basis of total dissolved solids, algal nutrients (N-P), and chlorophyll concentrations. Depletion of dissolved oxygen occurs regularly in the hypolimnion during late summer and late winter. Turquoise Lake is limnologically similar to Twin Lakes (Colo.) in most respects. Data contained in this report are useful to those interested in the limnology of high mountain lakes, including physical-chemical parameters, chlorophyll, plankton, and fish populations. Turquoise Lake provides source water to the Mt. Elbert forebay. Thus the baseline data provided here will be helpful in assessing the effects of pumped-storage powerplant operation on the limnology of Twin Lakes, Colo.

PB83-110528 PC **A04**/MF **A01**
Illinois State Water Survey, Urbana.
Water-Level Trends, Pumpage, and Chemical Quality in the Cambrian-Ordovician Aquifer in Illinois, 1971-1980,
Robert T. Sasman, Curtis R. Benson, R. Scott Ludwigs, and Tamara L. Williams. 1982, 68p ISWS/CIR-154/82

This report considers 1971-1980 pumpage and water-level changes, and 1980-1981 water quality, in deep sandstone wells penetrating the Cambrian-Ordovician aquifer, the most highly developed aquifer for large groundwater supplies in Illinois. Data from 43 counties, covering 48% of the state, are discussed, with emphasis on the Chicago region. From 1971 to 1980, there was a 12% increase in production from deep wells in northern Illinois, and a 22% increase in the Chicago region. These increases have resulted in excessive water-level declines in some deep wells. Withdrawals since 1971 within the Chicago region have exceeded the practical sustained yield of the Cambrian-Ordovician aquifer, as they have each year since 1958. The chemical analyses of samples taken from the aquifer in 1980-1981 indicate a general degradation of quality away from major aquifer recharge areas. The poorest quality waters are in the southwestern portion of the study area and the Chicago area.

PB83-111021 PC **A08**/MF **A01**
Woodward-Clyde Consultants, San Francisco, CA.
Sources of Urban Runoff Pollution and Its Effects on a Urban Creek.
Final rept. Nov 77-Apr 81,
Robert Pitt, and Martin Bozeman. Oct 82, 153p 60301, EPA-600/2-82-090
Grant EPA-R-805418
See also PB81-144487.

This report presents the final results and conclusions from an EPA-sponsored demonstration study of the water quality and biological effects of urban runoff on Coyote Creek, near San Jose, California. Various field procedures were used during the project to evaluate water, sediment, and biological changes in the creek as it passed through the urban area. The report describes the characteristics and sources of urban pollutants which affect the creek, and the effects and potential controls for urban runoff.

PB83-111104 PC **A13**/MF **A01**
Indian Inst. of Tech., New Delhi.
Finite Element Simulation of Groundwater System.
Doctoral thesis,
Raj Kishore Prasad. 1981, 292p

Two versatile digital models, direct and inverse, have been developed to meet the long felt need for better aquifer analysis and management. The direct model is based on finite element approximation of the governing differential equation of groundwater flow. A general purpose computer program AQUFER has been developed for this purpose. The model has two distinct features. It automatically backs out the natural flux from known steady state water table/piezometric data by solving the Poissons equation. The capability of the program has been tested by applying it to a real life complex basin in Northern India for studying a variety of management issues.

PB83-111310 PC **A03**/MF **A01**
Bureau of Reclamation, Denver, CO. Engineering and Research Center.
Characteristics and Applications of Big Sandy River, Glenwood Springs, and Dotsero Springs Waters in Energy Development,
Roy J. Eisenhauer. Jul 82, 30p REC-ERC-82-12
Color illustrations reproduced in black and white.

The Bureau of Reclamation is conducting studies to find methods for preventing high salinity point source waters from entering the Colorado River. There are three point sources that contribute a combined salt load of 344 700 metric tons per year. Big Sandy River contributes 117 900 metric tons per year, Glenwood Springs contribute 163 300 metric tons per year, and Dotsero Springs contribute 63 500 metric tons per year. Water analyses of the three saline point sources were made and the water was used in simulating coal slurry transport by pipeline. This study has confirmed some aspects of the proposed methods for disposal of these waters (deep well injection or by use in energy development).

PB83-111369 PC **A05**/MF **A01**
Bureau of Reclamation, Denver, CO. Engineering and Research Center.
Heavy Metals Pollution of the Upper Arkansas River, Colorado, and its Effects on the Distribution of the Aquatic Macrofauna,
Richard A. Roline, and John R. Boehmke. Sep 81, 80p REC-ERC-81-15

A limnology study was done on a 30 km section of the upper Arkansas River, Colorado, to determine the effects of heavy metals pollution on the distribution of the aquatic macrofauna. Physical and chemical water parameters were measured, aquatic macroinvertebrates were collected, and fish populations at selected stations were evaluated to determine density and heavy metal content of tissue. Historically, river flows which dilute heavy metal concentrations were not as high as those occurring since transmountain diversions began. However, water quality, species diversity of aquatic macroinvertebrates, fish populations, and metal accumulation in fish tissue show that heavy metal pollution of the upper Arkansas River near Leadville, Colorado, is presently very severe. Heavy-metal-laden inflows adversely affect water quality and thus the aquatic animal populations, while freshening inflows improve water quality and, therefore, conditions for the aquatic fauna.

PB83-111757 PC **A08**/MF **A01**
Environmental Protection Agency, Washington, DC. Criteria and Standards Div.
Economic Benefits of the Clean Lakes Program.
Sep 80, 160p EPA-440/5-80-081

By the end of fiscal year 1979, the Clean Lakes Program had approved 105 grants for over 40 million dollars--23 for state classification surveys and 82 for study and restoration work at specific lakes. Benefits were assessed for a 28-project sample drawn from the second group. The 28 projects, involving $15 million+ in Federal funds and an approximately equal sum from state and local agencies, are producing benefits in twelve categories: recreation, aesthetics, flood control, economic development, fish and wildlife, agriculture, property value, public health, and miscellaneous items. Many benefits could not be measured in monetary terms, but the present value of those which could is $127,448,500. This represents a return of $8.30 per Federal dollar expended, or $4.15 per total project dollar.

PB83-111765 PC **A08**/MF **A01**
Michigan State Univ., East Lansing.
Quantitative Techniques for the Assessment of Lake Quality,
Kenneth H. Reckhow. Jan 79, 158p EPA-440/5-79-015

This manual focuses on the role of phosphorus in lake eutrophication. If qualitatively presents the major causal linkages among the phosphorus-related components. Phosphorus was selected for this analysis because it is generally considered the most manageable of the major nutrients.

PB83-851899 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Water Resource Investigations for Tropical Regions. 1977-October, 1982 (Citations from the Selected Water Resources Abstracts Data Base).
Rept. for 1977-Oct 82.
Oct 82, 194p
Prepared in cooperation with Office of Water Research and Technology, Washington, DC.

This bibliography contains citations concerning tropical region water resources. The citations cover precipitation, runoff, surface water, ground water, and the associated effects on water supply, plant life, water quality, and aquatic fauna. Subject matter is both general, such as rainfall and runnoff models, and specific, such as studies of specific lakes or watersheds. Some citations cover water-related resource development studies. (Contains 125 citations fully indexed and including a title list.)

8I. Mining Engineering

AD-A119 420/8 PC **A09**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
The Estimation of the Cylindrical Wave Reflection Coefficient.
Technical rept.,
Andrew Loris Kurkjian. Jul 82, 193p Rept no. TR-495
Contract N00014-81-K-0742, Grant NSF-ECS80-07102

In the acoustic well logging problem an acoustic source and an array of receivers are placed in a borehole for the purpose of resolving the acoustic properties of the surrounding formation. In the existing approach to this problem, a received array is placed at a large offset from the source and energy refracted by the formation is analyzed. Here, a short-offset array is used to analyze energy reflected by the formation. The formation is modeled as cylindrically stratified and the concepts and properties of the monochromatic cylindrical wave and the cylindrical wave reflection coefficient are developed. The reflection coefficient as a function of frequency, but at a single axial wavenumber, is estimated from the reflected component of the total field on the axis of the borehole. A rapid method for generating arrays of synthetic acoustic logging data is developed and the data is used to test and evaluate the iterative Maximum Likelihood (ML) dereverberation scheme. The reflection coefficient estimates are found to be accurate within the passband of the source pulse except at those frequencies which excite modes. The estimation performance is sensitive to the array design and to the signal-to-noise ratio.

DE82007762 MF **A01**
Sandia National Labs., Albuquerque, NM.
Prediction of Hydraulic Fracture Azimuth from Anelastic Strain Recovery Measurements of Oriented Core.
L. W. Teufel. 1982, 6p SAND-82-0351C, CONF-820803-1
Contract AC04-76DP00789
23. US symposium on rock mechanics, Berkeley, CA, USA, 25 Aug 1982, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

A reliable method of predicting the azimuth of massive hydraulic fractures is of great importance to the gas industry in developing low permeability reservoirs. Knowledge of the fracture azimuth would allow optimum location and spacing of wells in a developing field and thus could increase recoveries an additional 30% of the total reservoir. In order to predict the azimuth of a hydraulic fracture it is necessary to know the direction of the minimum horizontal in-situ stress, because a hydraulic fracture propagates perpendicular to this stress direction. In this study an anelastic strain recovery technique is presented as a method of determining the directions and ratio of the maximum and minimum horizontal in-situ stresses from oriented cores from deep wells and thus enable prediction of the fracture orientation. (ERA citation 07:044877)

DE82008378 PC **A05**/MF **A01**
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Methane Recovery from Coalbeds Well Description and Field Activities LOG Procedures Manual. Technical Progress Report.
R. D. Malone, and C. W. Byrer. Apr 81, 78p DOE/METC/TPR-82-3
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The potential recovery of methane from coalbeds has led to the US Department of Energy's Methane Recovery from Coalbeds Project (MRCP). During the progress of this program, the Morgantown Energy Technology Center developed MRCP Resources Data Base System. In order to fully utilize the data base system, it became apparent that a set of Well Description and Field Activities Logs would be necessary in order to record all of the necessary and pertinent well information that would ultimately be entered into the Data Base System. This report describes the set of Well Description and Field Activity Logs that has been developed and discusses the procedures that will be followed in using the logs. It should be mentioned that as information becomes readily available, modification of these logs may be necessary. (ERA citation 07:052739)

DE82008421 MF **A01**
Society of Petroleum Engineers, Dallas, TX.
1981 SPE/DOE Symposium on Low-Permeability Gas Reservoirs. Proceedings.
1981, 572p CONF-810518-
Joint SPE/DOE symposium, Denver, CO, USA, 27 May 1981.
Best available copy from document source. Available in microfiche only.

Fifty five papers in this proceedings have been abstracted and indexed. These deal with enhanced recovery methods and characterization of low-permeability gas reservoirs. (ERA citation 07:042346)

DE82009043 MF **A01**
Mound Facility, Miamisburg, OH.
Eastern Gas Shales Mineback Report: Simulation Study of Constant Pressure Testing in the Devonian Shales.
W. K. Sawyer, K. Z. Shuck, and R. E. Zielinski. 1981, 101p DOE/DP/00053-1124, MLM-MU-82-61-0006
Contract AC04-76DP00053
Best available copy from document source. Available in microfiche only.

The objective of this study was to predict flow rate decline and pressure buildup behavior resulting from a 45-day constant pressure drawdown followed by a 45-day buildup period in the presence of wellbore storage, boundary effects, and realistic shale properties. Interference data, both drawdown and buildup were also reviewed to provide insight into primarily reservoir engineering studies for the Eastern Mineback Program but also for possible future offset well testing. (ERA citation 07:045760)

DE82009645 PC **A08**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Airborne gamma-Ray Spectrometer and Magnetometer Survey: Cleveland Quadrangle (PA, OH), Erie Quadrangle (PA). Final Report.
1981, 167p GJBX-42-82-V.2C
Contract AC13-79GJ01692
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Volume II-C contains: geology; radioactive mineral occurrences in Pennsylvania and Ohio; geophysical data interpretation; references; and appendices. The appendices are for the following; flight line map; geology map; explanation of geologic legend; flight line/geology map; pseudo-contour maps; stacked profiles; anomaly maps; geologic histograms; speed and altitude histograms; statistical tables; magnetic and ancillary profiles; and test line data. (ERA citation 07:052806)

DE82009667 MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Uranium Hydrogeochemical and Stream Sediment Reconnaissance of the Beechey Point NTMS Quadrangle, Alaska.
Jan 82, 45p GJBX-7-82
Contract AC13-76GJ01664
Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

This report presents results of a Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) of the Beechey Point NTMS quadrangle, Alaska. In addition to this abbreviated data release, more complete data are available to the public in machine-readable form. These machine-readable data, as well as quarterly or semiannual program progress reports containing further information on the HSSR program in general, or on the Los Alamos National Laboratory (LANI) portion of the program in particular, are available from DOE's Technical Library at its Grand Junction Area Office. Presented in this data release are location data, field analyses, and laboratory analyses of several different sample media. For the sake of brevity, many field site observations have not been included in this volume; these data are, however, available on the magnetic tape. Appendices A and B describe the sample media and summarize the analytical results for each medium. The data have been subdivided by one of the Los Alamos National Laboratory sorting programs of Zinkl and others (1981a) into groups of stream-sediment and lake-sediment samples. For each group which contains a sufficient number of observations, statistical tables, tables of raw data, and 1:1,000,000 scale maps of pertinent elements have been included in this

report. Also included are maps showing results of multivariate statistical analyses. Information on the field and analytical procedures used by the Los Alamos National Laboratory during sample collection and analysis may be found in any HSSR data release prepared by the Laboratory (see, for example, Planner and others, 1981) and will not be included in this report. (ERA citation 07:042377)

DE82010925 PC **A17**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Mathematical Modeling of the Behavior of Geothermal Systems under Exploitation.
G. S. Bodvarsson. Jan 82, 377p LBL-13937
Contract W-7405-ENG-48
Thesis. Portions of document are illegible.
Microfiche only after original copies are exhausted.

Analytical and numerical methods have been used in this investigation to model the behavior of geothermal systems under exploitation. The work is divided into three parts: (1) development of a numerical code, (2) theoretical studies of geothermal systems, and (3) field applications. A new single-phase three-dimensional simulator, capable of solving heat and mass flow problems in a saturated, heterogeneous porous or fractured medium has been developed. The simulator uses the integrated finite difference method for formulating the governing equations and an efficient sparse solver for the solution of the linearized equations. In the theoretical studies, various reservoir engineering problems have been examined. These include (a) well-test analysis, (b) exploitation strategies, (c) injection into fractured rocks, and (d) fault-charged geothermal reservoirs. (ERA citation 07:043082)

DE82011472 MF **A01**
Stanford Univ., CA. Stanford Geothermal Program.
Geothermal Reservoir Engineering Research at Stanford University. First Annual Report, October 1, 1980-September 30, 1981.
W. E. Brigham, R. N. Horne, P. Kruger, F. G. Miller, and H. J. Ramey, Jr. Sep 81, 72p SGP-TR-51
Contract AT03-80SF11459
Portions of document are illegible.
Available in microfiche only.

The work on energy extraction experiments concerns the efficiency with which the in-place heat and fluids can be produced. The work on noncondensable gas reservoir engineering covers both the completed and continuing work in these two interrelated research areas: radon emanation from the rock matrix of geothermal reservoirs, and radon and ammonia variations with time and space over geothermal reservoirs. Cooperative research programs with Italy and Mexico are described. The bench-scale experiments and well test analysis section covers both experimental and theoretical studies. The small core model continues to be used for the study of temperature effects on absolute permeability. The unconsolidated sand study was completed at the beginning of this contract period. The Appendices describe some of the Stanford Geothermal program activities that results in interactions with the geothermal community. These occur in the form of SGP Technical Reports, presentations at technical meetings and publications in the open literature. (ERA citation 07:049992)

DE82012593 MF **A01**
Colorado State Univ., Fort Collins. Dept. of Computer Science.
Feasible Control for In-Situ Retorts. Technical Report CS-81-20.
M. Andrews. 1981, 38p DOE/ET/13413-T1
Contract FG01-78ET13413
Portions of document are illegible.
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State-variable techniques have recently been applied to the modeling of total communications systems. This effort by the author has led to considerable insight into the problem of designing a communications link, including the transmitter, channel or transmission medium, and the receiver. Chemical process systems are not unlike communications systems. These systems require input variables such as concentration levels, and temperatures. Chemical processes, like a communication system, must then perform a linear (or non-linear) operation (like filtering) on the input variables so as to produce useable end products while maximizing or minimizing a net objective function. The purpose of this paper is to describe state modeling techniques to control an in-situ oil shale retort with focus on modified in-situ retorts. The specific issues in this paper are: (1) model the chemical process systems with state-variable techniques; (2) use these models to predict commercial in-situ retorting performance; and (3) identify critical parameters of the system and net gains or losses to be incurred, specifically, for varying oxygen/air pressures, bed pressure drops, and shale oil yield.

DE82013002 MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Analysis of Flow Data from Several Baca Wells.
T. D. Riney, and S. K. Garg. Dec 81, 8p LBL-13782, CONF-811201-3
Contract AC03-76SF00098
Workshop on geothermal reservoir engineering, Stanford, CA, USA, 16 Dec 1981, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Analyses are presented of the downhole pressure buildup data for wells located in the Redondo Creek area of the Baca Geothermal Field. The downhole drilling information and pressure/temperature surveys are first interpreted to locate zones at which fluid enters the wellbore from the fractured formation and to estimate the initial reservoir temperature and pressure in these zones. Interpretation of the buildup data for each well considers wellbore effects, the CO sub 2 content of the fluid and differentiates between the single-phase and two-phase portions of the data. Different straight-line approximations to the two portions of the data on the Horner plot for a flow test yield corresponding estimates for the single and two-phase mobilities. Estimates for the formation kh are made for the wells.

DE82013018 MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Practical Method for Modeling Fluid and Heat Flow in Fractured Porous Media.
K. Pruess, and T. N. Narasimhan. Feb 82, 38p LBL-13487, CONF-820242-1
Contract AC03-76SF00098
Symposium on reservior simulation, New Orleans, LA, USA, 1 Feb 1982, Portions of document are illegible. Best available copy from document source. Available in microfiche only.

A Multiple Interacting Continua method (MINC) is presented which is applicable for numerical simulation of heat and multi-phase fluid flow in multidimensional, fractured porous media. This method is a generalization of the double-porosity concept. The partitioning of the flow domain into computational volume elements is based on the criterion of approximate thermodynamic equilibrium at all times within each element. The thermodynamic conditions in the rock matrix are assumed to be primarily controlled by the distance from the fractures, which leads to the use of nested grid blocks. The MINC concept is implemented through the Integral Finite Difference (IFD) method. No analytical approximations are made for the coupling between the fracture and matrix continua. Instead, the transient flow of fluid and heat between matrix and fractures is treated by a numerical method. The geometric parameters needed in a simulation are preprocessed from a specification of fracture spacings and apertures, and the geometry of the matrix blocks. The MINC method is verified by comparison with the analytical solution of Warren and Root. Illustrative applications are given for several geothermal reservoir engineering problems.

DE82013258 MF **A01**
Equity Oil Co., Salt Lake City, UT.
BX In Situ Oil Shale Project. Quarterly Technical Progress Report, September 1-November 30, 1981.
P. M. Dougan. 20 Dec 81, 69p DOE/LC/10747-T5
Contract FC20-78LC10747
Portions of document are illegible.
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September 1, 1981-November 30, 1981, was the fourth consecutive quarter of superheated steam injection at the BX In Situ Oil Shale Project. During the quarter, 117,520 barrels of water as steam were injected into project injection wells at an average wellhead temperature of 715 exp 0 F and an average wellhead pressure of 1378 PSIG. During the same period, 148,516 barrels of fluid were produced from the project production wells for a produced-to-injected fluid ratio of 1.26 to 1.0. Net oil production for the quarter was 169 barrels. (ERA citation 07:045777)

DE82013282 MF **A01**
Kentucky Univ., Lexington. Dept. of Geology.
Isopach Map of Highly Radioactive Black Shale in the Cleveland Shale Member of the Ohio Shale (Unit 1) in Kentucky.
S. B. Dillman, and F. R. Ettensohn. 1981, 20p
METC/EGSP-506
Contract AC21-76ET12040
Portions of document are illegible.
Available in microfiche only.

No abstract available.

DE82013283 MF **A01**
Kentucky Univ., Lexington. Dept. of Geology.
Isopach Map of Highly Radioactive Black Shale in the Three Lick Bed and Huron Shale Member of the Ohio Shale (Units 2,3, 4 and 5) in Kentucky.
S. B. Dillman, and F. R. Ettensohn. 1981, 20p
METC/EGSP-505
Contract AC21-76ET12040
Portions of document are illegible.
Available in microfiche only.

No abstract available.

DE82013284 MF **A01**
Kentucky Univ., Lexington. Dept. of Geology.
Isopach Map of Highly Radioactive Black Shale in the Chattanooga Shale of South-Central Kentucky.
S. B. Dillman, and F. R. Ettensohn. 1981, 20p
METC/EGSP-502
Contract AC21-76ET12040
Portions of document are illegible.
Available in microfiche only.

No abstract available.

DE82013285 MF **A01**
Kentucky Univ., Lexington. Dept. of Geology.
Isopach Map of Highly Radioactive Black Shale in the West Falls Formation in Kentucky.
S. B. Dillman, and F. R. Ettensohn. 1981, 20p
METC/EGSP-503
Contract AC21-76ET12040
Available in microfiche only.

No abstract available.

DE82013328 MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Health and Safety Evaluation of a Modified Tunnel-Borer Design for Application to Single-Entry Coal-Mine Development.
W. F. Zimmerman. 15 Feb 82, 119p DOE/ET/12548-11, JPL-PUB-82-12
Contract AI01-76ET12548
Available in microfiche only.

The health and safety analysis is part of an overall effort to identify and develop innovative underground coal extraction systems. The single-entry tunnel borer system was initially considered an innovative approach to underground mining because it exhibited a means of increasing the speed and efficiency of entry development by reducing the number of entries. However, to be considered a truly advanced system, the tunnel borer had to meet distinct safety criteria as well. The objective was to examine the tunnel borer design and determine whether it offset major health hazards, and satisfied the prescribed safety levels. As a baseline for comparison, the tunnel borer was compared against the continuous mining entry driving system. The results of the health analysis indicated that while the tunnel borer design offered improvements in dust control through the use of water sprays, a higher face ventilation rate, and the application of spalling rather than the conventional grinding process, it interjected an additional mutagenic is and toxic compound into the environment through the use of shotcrete. The tunnel borer system easily conformed with the prescribed fatality limit, but exceeded the required limits for disabling and overall injuries. It also exhibited projected disabling and overall injury rates considerably higher than existing continuous mining injury rates. Consequently, the tunnel borer system was not considered an advanced system. (ERA citation 07:045626)

DE82013396 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.

Sedimentology of the Mesaverde Formation at Rifle Gap, Colorado and Implications for Gas-Bearing Intervals in the Subsurface.
J. C. Lorenz. Mar 82, 46p SAND-82-0604
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

The exposures of the Mesaverde Formation at Rifle Gap, Colorado, are of a regressive series of marine to fluvial deposits about 1650 m (5000 ft) thick. Grading up out of the marine Mancos Shale, the blanket shoreline sandstones of the Corcoran, Cozzette, and Rollins Sandstones record substages of the regression as delta lobes were activated and abandoned in northwestern Colorado during Late Cretaceous time. The overlying coals, sandstones, and carbonaceous mudstones were deposited on the paludal lower delta plain behind the shoreline. Meandering fluvial systems prograded over the paludal deposits. These systems deposited point-bar sandstones and overbank mudstones and siltstones in composite meander-belt trends, some of which are now gas-bearing, low-permeability reservoirs. Reorientation of the paleogeography during the Laramide orogeny (contemporaneous with fluvial deposition) probably changed the orientation of the meander belt trends. The uppermost sandstones at Rifle Gap, including the Ohio Creek conglomerate, are interpreted as shoreline deposits of a transgression that has been previously unrecognized in the area. Most of the record of this transgression has been destroyed by pre-Eocene erosion. The outcrops at Rifle Gap provide a basis for interpreting subsurface deposits in the Department of Energy's Western Gas Sands Project Multi-Well Experiment, 12 miles away.

DE82013469 MF A01
American Exploration Co., Worthington, OH.
VESCORP: Devonian Shale Project, Phase I Report.
1981, 65p DOE/ET/12387-T1
Contract AC05-77ET12387
Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

The investigation covered portions of Lawrence and Sciots Counties, Ohio, and that part of the Upper Devonian Shales known as Ohio Shale. Computer searches were made of Landsat, airphoto, high-altitude imagery, and low-altitude infrared imagery. Results indicate that the Devonian Shale production present in West Virginia and Kentucky extends westward and northward into Ohio. Recommendations are given for further study.

DE82013516 PC A07/MF A01
Eastern Associated Coal Corp., Pittsburgh, PA.
Demonstration of Tunnel-Boring Machine for Coal-Mine Development. Final Technical Report.
J. E. Tisdale, and D. R. Skidmore. Oct 79, 149p DOE/ET/12192-T1
Contract AC01-74ET12192
Portions of document are illegible.
Microfiche only after original copies are exhausted.

A concept of mine development using a single entry bored with a tunnel driving machine was designed and completed. The effort was undertaken in hopes that the single entry could be rapidly advanced through the strata along the coal seam and increase access to coal reserves at a much faster rate than present mining systems. The concept used was proven tunneling technology and it was not unreasonable to expect advance rates of 100 feet per day. The hardness of material to be mined was less than normally encountered in tunneling. The project was completed and an 18-foot diameter tunnel was driven about 6000 feet through the ultra-gassy Pittsburgh coal bed. The achieved rate of advance fell short of the anticipated rate. The delays to boring were many and varied, most resulting from the complex nature of the project and original design or use of most components. Boring started on January 14, 1976 and was completed on August 25, 1979; 617 days were available for boring. The project proved that a single entry could safely be mined through a gassy coal bed. The system incorporated seam degasification techniques, a unique system of rail haulage using battery-powered rail locomotives, a conveyor system to continuously discharge materials as the machine bored ahead, a concrete permanent divider to make the equivalent of two openings in the tunnel as it advanced and a shotcreting system that allowed a concrete liner to be applied. The system was in compliance with existing state and Federal mining laws as interpreted to apply to the unique tunneling project. (ERA citation 07:045625)

DE82013755 MF A01
Los Alamos National Lab., NM.
Hot Dry Rock Geothermal Energy Program.
Jan 82, 4p LALP-81-45
Contract W-7405-ENG-36
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The basics of extracting heat from rock, the hot-dry-rock program, and the participants and future of the program are reviewed.

DE82014291 MF A01
University of Southern California, Los Angeles. Earth and Space Sciences Inst.
Estimating Fracture Parameters from p-Wave Velocity Profiles About a Geothermal Well.
J. T. Jenkinson, T. L. Henyey, C. G. Sammis, P. C. Leary, and J. K. McRaney. Dec 81, 164p DOE/ID/12068-T1
Contract FC07-79ID12068
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The feasibility of locating fracture zones and estimating their crack parameters was examined using an areal well shoot method centered on Utah State Geothermal Well 9-1, Beaver County, Utah. High-resolution travel time measurements were made between a borehole sensor and an array of shot stations distributed radially and azimuthally about the well. Directional velocity behavior in the vicinity of the well was investigated by comparing velocity logs derived from the travel time data. Three fracture zones were identified form the velocity data, corroborating fracture indicators seen in other geophysical logs conducted in Well 9-1. Crack densities and average crack aspect ratios for these fracture zones were estimated using a self-consistent velocity theory (O'Connell and Budiansy 1974). Probable trends of these fracture zones were established from a combination of the data from the more distant shot stations and the results of a gravity survey. The results of this study indicate that the areal well shoot is a potentially powerful tool for the reconnaisance of fracture-controlled fluid and gas reservoirs. Improvements in methodology and hardware could transform it into an operationally viable survey method.

DE82014583 MF A01
Williams Bros. Engineering Co., Tulsa, OK. Process Div.
Assessment of Underground Coal Gasification in Bituminous Coals: Potential UCG Products and Markets. Final Report, Phase I.
31 Jan 82, 117p DOE/MC/14584-1193-V.2-Bk.2
Contract AC21-80MC14584
Portions of document are illegible.
Available in microfiche only.

The following conclusions were drawn from the study: (1) The US will continue to require new sources of energy fuels and substitutes for petrochemical feedstocks into the foreseeable future. Most of this requirement will be met using coal. However, the cost of mining, transporting, cleaning, and preparing coal, disposing of ash or slag and scrubbing stack gases continues to rise; particularly, in the Eastern US where the need is greatest. UCG avoids these pitfalls and, as such, should be considered a viable alternative to the mining of deeper coals. (2) Of the two possible product gases LBG and MBG, MBG is the most versatile. (3) The most logical use for UCG product in the Eastern US is to generate power on-site using a combined-cycle or co-generation system. Either low or medium Btu gas (LBG or MBG) can be used. (4) UCG should be an option whenever surface gasification is considered; particularly, in areas where deeper, higher sulfur coal is located. (5) There are environmental and social benefits to use of UCG over surface gasification in the Eastern US. (6) A site could be chosen almost anywhere in the Illinois and Ohio area where amenable UCG coal has been determined due to the existence of existing transportation or transmission systems. (7) The technology needs to be demonstrated and the potential economic viability determined at a site in the East-North-Central US which has commercial quantities of amenable bituminous coal before utilities will show significant interest.

DE82014931 MF A01
Cliffs Minerals, Inc., Rifle, CO.
Eastern Gas Shales Project: Dow Chemical Wells No. 100, No. 103, and No. 205. Phase III Report, Summary of Laboratory Analyses and Mechanical Characterization Results.
Dec 81, 72p DOE/MC/08199-T8
Contract AC21-78MC08199
Portions of document are illegible.
Available in microfiche only.

This summary presents a detailed characterization of the Devonian Shale occurrence in the Dow Chemical No. 100, No. 103, and No. 205 wells. Information provided includes a stratigraphic summary and lithology and fracture analyses resulting from detailed core examinations and geophysical log interpretations at the EGSP Core Laboratory. Plane of weakness orientations stemming from a program of physical properties testing on samples from the Dow Chemical No. 103 core at Michigan Technological University are also summarized; the results of physical properties testing are dealth with in detail in the accompanying report. The data presented was obtained from the study of approximately 617 feet of core retrieved from several wells drilled in Sanilac County of east-central Michigan.

DE82014932 MF A01
Cliffs Minerals, Inc., Rifle, CO.
Eastern Gas Shales Project: Ohio No. 5 Well, Lorain County. Phase III Report, Summary of Laboratory Analyses and Mechanical Characterization Results.
Aug 81, 99p DOE/MC/08199-T7
Contract AC21-78MC08199
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This summary presents a detailed characterization of the Devonian Shale occurrence in the EGSP-Ohio No. 5 well. Information provided includes a stratigraphic summary and lithology and fracture analyses resulting from detailed core examinations and geophysical log interpretations at the EGSP Core Laboratory. Plane of weakness orientations stemming from a program of physical properties testing at Michigan Technological University are also summarized; the results of physical properties testing are dealt with in detail in the accompanying report. The data presented was obtained from the study of approximately 881 feet of core retrieved from a well drilled in Lorain County of north-central Ohio.

DE82014996 MF A01
Cliffs Minerals, Inc., Rifle, CO.
Eastern Gas Shales Project: West Virginia No. 7 Well, Wetzel County. Phase III Report, Summary of Laboratory Analyses and Mechanical Characterization Results.
Dec 81, 92p DOE/ET/08199-T6
Contract AC21-78MC08199
Portions of document are illegible.
Available in microfiche only.

This summary presents a detailed characterization of the Devonian Shale occurrence in the EGSP-West Virginia No. 7 well. Information provided includes a stratigraphic summary and lithiology and fracture analyses resulting from detailed core examinations and geophysical log interpretations at the EGSP Core Laboratory. Plane of weakness orientations stemming from a program of physical properties testing at Michigan Technological University are also summarized; the results of physical properties testing are dealt with in detail in the accompanying report. The data presented was obtained from the study of approximately 533 feet of core retrieved from a well drilled in Wetzel county of north-central West Virginia.

DE82015001 MF A01
Cliffs Minerals, Inc., Rifle, CO.
Eastern Gas Shales Project: Pennsylvania No. 1 Well, McKean County. Phase III Report, Summary of Laboratory Analyses and Mechanical Characterization Results.
Oct 81, 91p DOE/MC/08199-T11
Contract AC21-78MC08199
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This summary presents a detailed characterization of the Devonian Shale occurrence in the EGSP-Pennsylvania No. 1 well. Information provided includes a stratigraphic summary and lithology and fracture analyses resulting from detailed core examinations and geophysical log interpretations at the EGSP Core Laboratory. Plane of weakness orientations stemming from a program of physical properties testing at Michigan Technological University are also summarized; the results of physical properties testing are dealt with in detail in the accompanying report. The data presented was obtained from the study of approximately 741 feet of core retrieved from a well drilled in MeKean County of north-central Pennsylvania.

DE82015002 MF **A01**
Cliffs Minerals, Inc., Rifle, CO.
Eastern Gas Shales Project: Pennsylvania No. 4 Well, Indiana County. Phase III Report, Summary of Laboratory Analyses and Mechanical Characterization Results.
Oct 81, 81p DOE/MC/08199-T5
Contract AC21-78MC08199
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This summary presents a detailed characterization of the Devonian Shale occurrence in the EGSP-Pennsylvania No. 4 well. Information provided includes a stratigraphic summary and lithology and fracture analyses resulting from detailed core examinations and geophysical log interpretations at the EGSP Core Laboratory. Plane of weakness orientations stemming from a program of physical properties testing at Michigan Technological University are also summarized; the results of physical properties testing are dealt with in detail in the accompanying report. The data presented was obtained from the study of approximately 891 feet of core retrieved from a well drilled in Indiana County of west-central Pennsylvania.

DE82015014 MF **A01**
Cliffs Minerals, Inc., Rifle, CO.
Eastern Gas Shales Project: Pennsylvania No. 3 Well, Erie County. Phase III Report, Summary of Laboratory Analyses and Mechanical Characterization Results.
Sep 81, 79p DOE/MC/08199-T9
Contract AC21-78MC08199
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This summary presents a detailed characterization of the Devonian Shale occurrence in the EGSP-Pennsylvania No. 3 well. Information provided includes a stratigraphic summary and lithology and fracture analyses resulting from detailed core examinations and geophysical log interpretations at the EGSP Core Laboratory. Plane of weakness orientations stemming from a program of physical properties testing at Michigan Technological University are also summarized; the results of physical properties testing are dealt with in detail in the accompanying report. This data presented was obtained from the study of approximately 422 feet of core retrieved from a well drilled in Erie County of north-western Pennsylvania.

DE82015021 MF **A01**
Cliffs Minerals, Inc., Rifle, CO.
Eastern Gas Shales Project: Pennsylvania No. 5 Well, Lawrence County. Phase III Report, Summary of Laboratory Analyses and Mechanical Characterization Results.
Oct 81, 96p DOE/MC/08199-T10
Contract AC21-78MC08199
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This summary presents a detailed characterization of the Devonian Shale occurrence in the EGSP-Pennsylvania No. 5 well. Information provided includes a stratigraphic summary and lithology and fracture analyses resulting from detailed core examinations and geophysical log interpretations at the EGSP Core Laboratory. Plane of weakness orientations stemming from a program of physical properties testing at Michigan Technology University are also summarized; the results of physical properties testing are dealt with in detail in the accompanying report. The data presented was obtained from the study of approximately 604 feet of core retrieved from a well drilled in Lawrence County of west-central Pennsylvania.

DE82015082 PC **A06**/MF **A01**
Los Alamos National Lab., NM.
Hot-Dry-Rock Geothermal Resource 1980.
G. Heiken, F. Goff, and G. Cremer. Apr 82, 117p LA-9295-HDR
Contract W-7405-ENG-36
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The work performed on hot dry rock (HDR) geothermal resource evaluation, site characterization, and geophysical exploration techniques is summarized. The work was done by region (Far West, Pacific Northwest, Southwest, Rocky Mountain States, Midcontinent, and Eastern) and limited to the conterminous US.

DE82015085 MF **A01**
Pittsburgh Univ., PA. Dept. of Civil Engineering.
Professional Technical Support Services for the Mining Equipment Test Facility. First Annual Technical Progress Report, April 14-September 30, 1981.
R. C. Garson. Oct 81, 41p DOE/PC/42255-5
Contract AC22-81PC42255
Available in microfiche only.

The Department of Energy recently began the operation of its Mining Equipment Test Facility. One component at that facility is the highly sophisticated Mine Roof Simulator (MRS) for research and development of roof support equipment. Because of its previous experience, the University of Pittsburgh was contracted to assist the Facilities Manager by providing professional technical support services, principally for the MRS. This technical progress report briefly describes the services provided during the reporting period and planned for the next period. No significant technical disclosures of interest to those not associated with the MRS are contained herein. One of the four units of the US government-owned METF is the Mine Roof Simulator. This unique $10 million test facility was designed to simulate underground mine roof loads and motions. The MRS is a hybrid, analog-digital, computer-controlled, closed-loop, electro-hydraulic, research device capable of applying either loads or displacements in the vertical and one horizontal axis. Its vertical capacity of 3,000,000 pounds can be applied over its 20 by 20 foot active test area. The horizontal load capacity is 1,600,000 pounds. It can simulate coal seam heights of up to 16 feet. Automatic data acquisition and real time display are provided. The most modern, sophisticated technology was used in its design and construction.

DE82015208 PC **A05**/MF **A01**
Keplinger and Associates, Inc., Tulsa, OK.
Review of Statistical Methods Used in Enhanced-Oil-Recovery Research and Performance Prediction.
J. E. Selvidge. Jun 82, 83p DOE/BC/10033-1
Contract AC19-80BC10033

Recent literature in the field of enhanced oil recovery (EOR) was surveyed to determine the extent to which researchers in EOR take advantage of statistical techniques in analyzing their data. In addition to determining the current level of reliance on statistical tools, another objective of this study is to promote by example the greater use of these tools. To serve this objective, the discussion of the techniques highlights the observed trend toward the use of increasingly more sophisticated methods and points out the strengths and pitfalls of different approaches. Several examples are also given of opportunities for extending EOR research findings by additional statistical manipulation. The search of the EOR literature, conducted mainly through computerized data bases, yielded nearly 200 articles containing mathematical analysis of the research. Of these, 21 were found to include examples of statistical approaches to data analysis and are discussed in detail in this review. The use of statistical techniques, as might be expected from their general purpose nature, extends across nearly all types of EOR research covering thermal methods of recovery, miscible processes, and micellar polymer floods. Data come from field tests, the laboratory, and computer simulation. The statistical methods range from simple comparisons of mean values to multiple non-linear regression equations and to probabilistic decision functions. The methods are applied to both engineering and economic data. The results of the survey are grouped by statistical technique and include brief descriptions of each of the 21 relevant papers. Complete abstracts of the papers are included in the bibliography. Brief bibliographic information (without abstracts) is also given for the articles identified in the initial search as containing mathematical analyses using other than statistical methods.

DE82015787 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Mechanical Behavior of Anvil Points Oil Shale at Elevated Temperatures and Confining Pressures.
D. H. Zeuch. Apr 82, 64p SAND-82-0164
Contract AC04-76DP00789

Twenty-one constant strain rate compression tests have been performed on 80 ml/kg (20 GPT) Anvil Points oil shale at elevated temperatures (50 to 200 exp 0 C) and confining pressures (0.5 to 40 MPa). The strength of oil shale increases with confining pressure and decreases with temperature. Ductility is greatly enhanced by addition of confining pressure. Elevated temperatures have little influence on ductility at low confining pressures; however, at greater confining pressures, temperature exerts a progressively stronger influence on ductility. A purely empirical failure law, incorporating the effects of temperature and confining pressure, has been fitted to the data. The failure law is in good agreement with the results of other studies on the compressive strength of oil shale. All specimens in this study exhibited some fracturing in post-test examination. However, with increasing temperature and confining pressure, plots of compressive differential stress versus axial strain tend to level off after an initial transient period of increasing stress. This indicates that (1) we are approaching the brittle-ductile transition, and (2) time-dependent effects may be important under physical conditions comparable to those of this study.

DE82015828 PC **A04**/MF **A01**
Los Alamos National Lab., NM.
Economic Model for Evaluating the Tradeoffs Between Coal Mining and Surface Subsidence.
M. S. Walbert, and R. J. Sutherland. May 82, 65p LA-9348-MS
Contract W-7405-ENG-36
Portions of document are illegible.
Microfiche only after original copies are exhausted.

This report has presented an economic model of the tradeoffs among the benefits of developing coal reserves, the costs of preventing surface subsidence, and the costs of subsidence damage. The model recognizes the potentially disparate interests of coal miners and surface landowners, and shows the social benefits of coal extraction are reduced by the external costs of production, specifically, subsidence damage. Thus, the model is designed to assist a government agency in resolving the conflicting goals of profit maximization in coal mining and protecting aboveground property values. Decision tree analysis is used to assess the net social value of various decision paths. Each decision path is characterized by different combinations of potential actions by the mine operator and the landowners. Thirteen decision paths are delineated. By way of illustration, along one path, the present value of the net benefits the firm expects to earn by mining coal is reduced by the present value of the expected damage costs resulting from subsidence. Along another path, the present value of expected net benefits is reduced by the present value of the expected costs of subsidence prevention, the expected costs of subsidence damage prevention, and the present value of the expected costs of subsidence damage. This latter estimate is weighted by the expected reduction in damage resulting from actions taken by the firm (underground) and the landowners (aboveground) to reduce subsidence and subsidence damage.

DE82016129 PC **A05**/MF **A01**
Los Alamos National Lab., NM.
Geothermal Investigations in Ohio and Pennsylvania.
Y. Eckstein, R. A. Heimlich, D. F. Palmer, and S. S. Shannon, Jr. Apr 82, 93p LA-9223-HDR
Contract W-7405-ENG-36

New values of heat flow were determined for the Appalachian Plateau in eastern Ohio and northwestern Pennsylvania. Corrected values for wells in Washington and Summit Counties, Ohio, are 1.36 and 1.37 heat-flow units (HFU), respectively. Those of 1.84 and 2.00 HFU define a previously unknown heat-flow high in Venango and Clarion counties, Pennsylvania. Thermal conductivity was measured for core samples from 12 wells in Ohio and 6 wells in Pennsylvania. Heat production was determined for 34 core and outcrop samples from Ohio, Pennsylvania, and New Jersey.

DE82902504 PC A07/MF A01
Virginia Div. of Mineral Resources, Charlottesville.
Analyses of Coal Samples Collected 1975-1977.
J. A. Henderson, Jr., C. S. Oman, and S. L. Coleman.
1981, 141p NP-2902504

In late 1975 the Virginia Division of Mineral Resources began a sampling program of coal beds in Virginia in cooperation with the US Geological Survey and the US Bureau of Mines. A total of 134 samples were collected from coal beds of Pennsylvanian Age in five of the seven counties in the southwest Virginia coal field. Channel samples were collected at each of the sampling sites. In addition, supplemental samples of the roof- and floor-rock and major partings were collected at many sample sites, but were not analyzed. The samples are from most of the major coal beds in southwest Virginia, and are from fresh exposures in active surface and underground mines. Chemical analyses were made by the US Bureau of Mines and the US Geological Survey. The US Bureau of Mines analyses include the proximate and ultimate analyses, forms of sulfur, heat value, fusibility of ash, and the free, swelling index. The US Geological Survey analyses include the major-, minor-, and trace-element concentrations in both ash and whole coal. Statistical tables contain arithmetic and geometric means, observed range, and the standard deviation for samples collected in Virginia and are compared with samples in the National Coal Resources Data System for Tennessee, Kentucky and West Virginia. (ERA citation 07:045587)

DE82902510 PC A04/MF A01
Wyoming Dept. of Labor and Statistics, Cheyenne.
Wyoming Oil and Natural Gas Drilling, Production, and Refining: A Wage and Employment Survey.
1980, 68p NP-2902510

The Wyoming Department of Labor and Statistics simultaneously initiated wage and employment surveys of the State's crude petroleum and natural gas drilling and production and oil refinery industries during the fourth quarter of 1980. The surveys were designed to update the statistics obtained in the 1979 survey of crude petroleum and natural gas extraction and the 1977 survey of oil refineries. Specifically, data were collected to: (1) Estimate the number of workers in selected occupational categories; (2) Determine the average straight-time hourly wage in each occupational category; (3) Estimate the percent of workers covered by a collective bargaining agreement in each occupational category; and (4) Review the employer contributions to employee fringe benefit programs. Results of the survey are presented in this report. (ERA citation 07:045706)

PB83-110965 PC A03/MF A01
Woodward Associates, Inc., San Diego, CA.
Development of Materials and Strategies for Pre-Shift Equipment Inspection. Volume III. Review of Sand and Gravel Operations and Training Needs.
Rept. for 20 Jun-30 Nov 79,
Mary Ann Bennett, and Louis Schaffer. 27 Dec 79, 41p BUMINES-OFR-139(3)-82
Contract H0377101
See also Volume 2, PB82-259227.

Volume 3 of the Development of Materials and Strategies for Preshift Equipment Inspection program describes a review of selected plants in the sand and gravel and crushed stone industries, conducted with the objective of identifying the preshift inspection and other training needs not covered by materials presently available. An analysis of the data acquired to characterize the work practices is included as well as recommendations for the development of training materials.

PB83-111245 PC A03/MF A01
Bureau of Mines, Denver, CO. Denver Research Center.
Acoustic Emission Source Location: A Mathematical Analysis.
Rept of investigations/1982,
Francis R. Redfern, and Robert D. Munson. Aug 82, 34p BUMINES-RI-8692
Errata sheet inserted.

Newton's method of solving a nonlinear equation is employed to develop a least-squares acoustic emission source location method in which the spatial residuals of the location equations are minimized. These residuals, related to the distances from the least-squares source location perpendicular to the surfaces described by the location equations, permit location error to be estimated to first order along the spatial axes. The solutions obtained by this method are the best spatial solutions to the location equations in the least-squares sense. Also presented is a procedure by which the geometrical control of a transducer array can be evaluated using the rate of change of source location with fractional velocity change.

PB83-111252 PC A04/MF A01
Bureau of Mines, Denver, CO. Denver Research Center.
Software Techniques in Microseismic Data Acquisition.
Rept. of investigations/1982,
John P. Coughlin. Aug 82, 57p BUMINES-RI-8691

Software techniques developed by the Bureau of Mines Denver Research Center for real-time microseismic data analysis are presented. These techniques focus on the simple acquisition of P-wave arrival times and their use in event location. The paper discusses in detail software techniques to separate microseismic events from mining noise such as drilling and from very large events such as rock bursts. Incorporation of these techniques has enhanced the reliability and accuracy of computer-based monitoring of microseismic activity in ongoing research by the Bureau.

PB83-111450 PC A02/MF A01
Bureau of Mines, Denver, CO. Denver Research Center.
A Case History of a Major Rock Burst.
Rept. of investigations/1982,
Fred Leighton. Aug 82, 20p BUMINES-RI-8701

The Bureau of Mines monitored a rock-burst-prone pillar in a metallic ore vein, up to and through failure, to measure its reactions to increasing loads, as it was mined. Three parameters were monitored: the stress changes at chosen points within the pillar, the displacement characteristics of the drift above the pillar, and the microseismic activity in and around the pillar. In descending order of effectiveness, the microseismic technique, vibrating wire stress measurements, and displacement measurements reflected the pillar reactions, and all showed good correlation to one another. A major rock burst in the pillar, which destroyed about 100 feet of drift above the pillar, occurred at the end of this study. This burst was preceded by a large anomaly in the microseismic activity in the failure area.

PB83-112052 PC A11/MF A01
State Univ. of New York at Stony Brook. Marine Sciences Research Center.
Stabilized Coal Waste in the Chesapeake Bay-Choptank River Estuary: Environmental Investigations.
Final rept.,
I. W. Duedall, E. M. Humphries, M. G. Heaton, S. A. Oakley, and R. J. Wilke. May 82, 230p PPSP/PPRP-49
Prepared in cooperation with Maryland Univ., Cambridge. Horn Point Environmental Labs.

Chemical, physical, and biological studies of the environmental acceptability of disposal and artificial reef construction with stabilized coal waste materials were conducted in the laboratory and at a field site in the Chesapeake Bay - Choptank River Estuary. The studies were directed at determining (1) the extent and type of release of block chemical constituents to the environment, (2) the physical stability of the block material in estuarine waters, and (3) the characteristics of biological growth and community structure on the coal waste blocks relative to other substrates.

PB83-112185 PC A11/MF A01
Northeastern Forest Experiment Station, Broomall, PA.
Stream Water Quality in the Coal Region of Eastern Kentucky.
General technical rept. (Final),
Kenneth L. Dyer. 1982, 230p NEFES/83-3, FSGTR-NE-74
Prepared in cooperation with Industrial Environmental Research Lab.-Cincinnati, OH.

Data collected in 1977-79 from 38 small streams that drain unmined watersheds and 86 that drain areas where coal has been surface mined include common ions, alkalinity, acidity, pH, 16 trace elements, 5 nitrogen and phosphorous species, specific conductance, suspended solids, turbidity, settleable matter, water temperature, and estimated discharge.

PB83-113969 PC E10/MF E10
Commission of the European Communities, Luxembourg.
Etat du Droit Minier et de la Fiscalite des Actinides Dans les Pays Membres de la Communaute (The Position Regarding Mining Rights and Taxaton of the Actinides in the Member States of the Community).
c1981, 243p EUR-7155-FR, ISBN-92-825-2677-1
Text in French.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The legislation on mining rights in each of the Member States is presented in the nine individual studies forming part 1 of the report. For comparison purposes, the information contained in each report is organized and examined according to the following plan: general characteristics of legal regulations applicable to uranium containing deposits; the right to actuate a mining enterprise and interventions of the state in mining activities. Part 2 of the report consists of a synoptic table of the legislative enactments of the nine Member States.

PB83-114744 PC A06/MF A01
Ansul Co., Marinette, WI.
Improved Fire Protection System for Underground Fueling Areas. Volume II.
Final rept. Sep 77-Oct 81,
Lyle McDonald, Dennis Kennedy, and Gene Reid.
Oct 81, 111p BUMINES-OFR-160-82
Contract H0262023
See also Volume 1, PB-288298.

The objectives of this investigation were to (1) develop safe practice guidelines that will minimize the chance of fires in underground fueling areas and (2) to develop a low-cost, reliable, automatic fire control system (AFCS) for underground fueling areas. Volume I of the report covered the period from June 21, 1976, to September 30, 1977, and included (1) the preparation of safe practice guidelines for underground fueling areas; (2) preparation of recommended AFCS design concepts for underground fueling areas; and (3) the design, fabrication, and in-mine fire test of an AFCS at Pine Creek Mine, Bishop, Calif. Volume II of the report covers the period from September 30, 1977, to September 30, 1981, and includes (1) a long-term validation test of the AFCS in the Pine Creek Mine, (2) a study of the environmental effects of aqueous film-forming foam, (3) the design and installation of a system at AMAX Buick Mine, Boss, Mo., (4) the design of a system for enclosed fuel areas, and (5) the design of a system for semipermanent fueling areas.

PB83-114876 PC A11/MF A01
Ansul Co., Marinette, WI.
Automatic Fire Protection System for Mobile Underground Metal Mining Equipment. Volume II. Long Term Validation Testing.
Rept. for 1 Jul 76-Feb 81,
Lyle A. McDonald, and Gene R. Reid. Feb 81, 242p BUMINES-OFR-159-82
Contract H0252038
See also Volume 1, PB-268735.

The objective of this investigation was the development and in-mine testing of an automatic fire control system (AFCS) for mobile underground metal mining equipment. Volume I of this report described the tasks through the development of a first generation prototype AFCS that was installed on a ST-2B-LHD vehicle at the Hecla Lakeshore project at Casa Grande, Ariz., and on the demonstration of system performance on the vehicle in underground fire tests. Volume II primarily concerns the long-term validation testing of the prototype AFCS. Validation testing was performed on the demonstration system plus six additional subsequent generation prototype systems on vehicles in four mines. In addition, work was done to determine the possible personnel exposure hazard presented by multipurpose dry chemical fire extinguishants.

PB83-851477 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Geological Surveys for Coal. 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Oct 82.
Oct 82, 164p
Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning techniques, instruments, and equipment used in geological surveying for coal. Geologic characteristics and geographical structure of coal mines are discussed. Resource and site assessment and characterization are considered. Seismic analysis and depositional environments of coal mines are also discussed. (Contains 149 citations fully indexed and including a title list.)

PB83-851485 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Geological Surveys for Petroleum and Natural Gas. 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Oct 82.
Oct 82, 299p
Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning techniques, instruments, and equipment used in geological surveying for petroleum and natural gas. Geologic structure and formation characteristics associated with petroleum and gas deposits are discussed. Geologic remote sensing and petrography technology are included. (Contains 300 citations fully indexed and including a title list.)

PB83-852152 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Well Perforation Technology. 1974-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1974-Oct 82.
Oct 82, 68p

This bibliography contains citations concerning research and developments of well perforating technology. Methods and procedures, equipment innovations, backsurging technology for cleaning old perforations, liquid absorption and production effects are among the topics included. Applications to water, gas, oil and leaching wells are discussed. (Contains 67 citations fully indexed and including a title list.)

PB83-852160 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Well Perforation Technology. 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Oct 82.
Oct 82, 131p
Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning research and developments of well perforating technology. Methods and equipment, well stimulation effects, backsurging and abrasive-perforating procedures, comparative evaluations of the various perforating procedures, and technology relative to plugging perforated zones are among the topics discussed. Applications to oil and gas wells predominate; however, utilization of the technology for water and disposal wells are also presented. (Contains 135 citations fully indexed and including a title list.)

PB83-852251 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Gravity Surveys for Geothermal Resources. June, 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for Jun 76-Oct 82.
Oct 82, 226p
Supersedes PB81-855678.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning the exploration for geothermal resources by means of gravity surveys. Various potential geothermal resource sites in the United States, where gravity surveys were conducted, are also discussed. (This updated bibliography contains 212 citations, 76 of which are new entries to the previous edition.)

PB83-852269 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Comminution of Metallic Ores and Metal Powders. 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Oct 82.
Oct 82, 171p
Supersedes PB82-858242.

This bibliography contains citations concerning the comminution of metallic ores, ductile and hard metal powders, sponge iron, and coal fuels. Milling processes discussed include jet mills, hammer mills, ball and rod mills, and twin roller comminution. Autogenous milling, low temperature comminution, chemical additives, mathematical modeling, computer control, and energy-size reduction analysis are topics considered in this bibliography. (This updated bibliography contains 183 citations, 11 of which are new entries to the previous edition.)

8J. Physical Oceanography

AD-A119 445/5 PC **A07/MF A01**
Planning Systems, Inc., McLean, VA.
A Physical Sediment Model for the Prediction of Seafloor Geoacoustic Properties.
Final rept. 1 Jan-30 Jul 82,
Burlie A. Brunson, and Eugene J. Molinelli. Jul 82, 144p Rept no. PSI-TR-216227
Contract N00014-82-C-0121

A study was performed to adapt, implement, and test a version of the Biot/Stoll physical sediment model in a form which allows the prediction of those geoacoustic properties needed by current Navy acoustic or bottom loss calculation models. Particular attention was paid to the depth and frequency dependence of compressional wave speed and attentuation; two properties considered to be most important to acoustic modeling. Additionally, input sensitivity studies yielded insight into certain 'critical factors' important to accurate geoacoustic property predictions. Model predictions of seafloor geoacoustic properties were compared with speed and attenuation values measured directly or inferred from acoustic measurements for a deep water site near DSDP site 135, and a shallow water site near Panama City, Florida. The acoustic significance of observed differences in geoacoustic properties was assessed by comparing the outputs of a complex reflection coefficient model using inputs derived from physical sediment properties using the Biot/Stoll approach and inputs derived from acoustical measurements using the inversion technique developed for the Bottom Loss Upgrade (BLUG). The study yield positive evidence that the physical seidment approach is useful. The Biot/Stoll model is a potentially powerful tool for estimating or extrapolating geoacoustic parameters, particularly when a priori estimates are needed in geographic areas or frequency regimes which have not been acoustically surveyed. (Author)

AD-A119 773/0 PC **A07/MF A01**
National Research Council, Washington, DC. Committee on Arctic Seafloor Engineering.
Understanding the Arctic Sea Floor for Engineering Purposes.
1982, 141p
Grant N00014-80-G-0034

This report identifies and assesses those artic seafloor phenomena that influence the design and operation of facilities and platforms for exploring and producing oil, gas, and hard minerals both on and under the sea floor. It also identifies knowledge that is needed of seafloor phenomena and conditions, and, for several areas of major concern, recommends specific research. These recommendations are intended to enhance the ability of the engineer and operator to anticipate and avoid problems that may be posed by seafloor and coastal phenomena, and guard against the effects of such events as thaw subsidence and erosion. Permafrost, often thought to be found only on land, is found extensively beneath the sea floor of the Beaufort Sea, and, to an extent not well known, under the Chukchi and Bering seas. A relict of the geological past, it was covered by rising artic oceans. Permafrost can deteriorate because of natural or man-induced effects and can reform again.

AD-A119 785/4 PC **A03/MF A01**
Naval Ocean Research and Development Activity, NSTL Station, MS.
HALS Post Processing Software Design.
Final rept.,
H. J. Byrnes. Sep 82, 48p Rept no. NORDA-TN-161

This report discusses software that was designed and developed to process Hydrographic Airborne Laser Sounder (HALS) data tapes. The HALS survey produces tapes containing navigational, heading, altitude, and various housekeeping information, as well as raw laser ranging data from which ocean depths are to be extracted in a post-mission processing mode. The software performs its tasks in four sequential processing passes. Pass 1 processing techniques are based on research results concerning depth measurement bias caused by light propagation in sea water. Pass 2 utilizes computer/operator interactive CRT display techniques for editing purposes and computes position via an interactive process using Sodano inverse formulas. Pass 3 utilizes optimal filter techniques to resolve aircraft altitude, pitch, roll, and sea surface waves via a minimum variance solution on the slant range laser measurement from aircraft to sea surface. Pass 4 also operates via optimal filter theory and is designed to treat both depth error and position error simultaneously.

N82-31865/8 PC **A03/MF A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Preliminary Results of a Statistical Model for Prediction of the Vertical Thermal Structure of the Waters to the Southeast of Brazil Resultados Preliminares de Um Modelo Estatistico Para Predicao DA Estrutura Termica Vertical NAS Aguas Do Sudeste Do Brasil.
J. L. Stech, M. R. Stevenson, and H. M. I. Villagra.
Feb 82, 27p INPE-2331-RPE/405
Text in Portugese. Presented at the 33RD Ann. Meeting of Sbpc, Salvador, Brazil, 8-15 Jul. 1981.

A correlation between the surface and vertical temperatures of the sea is discussed. For this, an ocean area was selected extending from 22 deg S to 25 deg S Latitude and 40 deg W to 45 deg W in the southwest Atlantic Ocean. The area was subdivided into squares of 1/2 deg by 1/2 deg. Two of these squares were utilized, one close to the coast and the other being more oceanic. The calculated statistical parameters relating the surface and vertical temperature structures were: mean temperature, standard deviation, variance and confidence intervals for every period of three months and for the two squares. The relationships found were good and consistent with the data utilized.

PAT-APPL-6-365 845 PC **A02/MF A01**
Department of the Navy, Washington, DC.
A Generalized Drifting Oceanographic Sensor.
Patent Application,
Samuel W. Marshall. Filed 5 Apr 82, 8p AD-D009 691/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A generalized drifting oceanographic sensor (GDOS) is cast adrift in the oceanographic environment along a pre-programmed depth schedule. A variable buoyancy housing has one or more external oceanographic sensors and an external acoustic telemetry transducer. Signal processing electronics are contained internal to the housing together with an electric power pack and multiplexer. The data from the sensors are processed, multiplexed and transmitted by the acoustic transducer. Additional data are obtained from azimuthal correlation by two or more fixed acoustic receivers. (Author)

PB83-112433 PC **A09/MF A01**
National Oceanic and Atmospheric Administration, Seattle, WA. Pacific Marine Environmental Lab.
Dissolved Methane Concentrations in the Southeast Bering Sea, 1980 and 1981.
Data rept.,
Charles N. Katz, Joel D. Cline, and Kimberly Kelly-Hansen. Jul 82, 200p NOAA-DR-ERL-PMEL-6, NOAA-82092205

The purpose of this program is to identify potential environmental impacts to marine resources prior to the leasing and development of offshore petroleum and gas. These data were collected to assess the spatial and seasonal distributions of methane in order to esti-

mate Lagrangian spece scales and the magnitude of diffusive transport processes.

PB83-851444 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Seamounts. 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Oct 82.
Oct 82, 180p

This bibliography contains citations concerning studies of seamounts. Oceanographic observations, morphological characteristics, crust and upper mantle structures of seamounts are discussed. Acoustic and modeling techniques are included. (Contains 146 citations fully indexed and including a title list.)

PB83-851451 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Seamounts. 1974-October, 1982 (Citations from Oceanic Abstracts).
Rept. for 1974-Oct 82.
Oct 82, 106p
Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

This bibliography contains citations concerning studies of seamounts. Geological structures, mineralogical analysis, and geomorphology of seamounts are discussed. Volcanic seamounts and remote sensing techniques are included. Aquatic animals and plants associated with seamounts are considered. (Contains 103 citations fully indexed and including a title list.)

PB83-851469 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Seamounts. 1975-October, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Oct 82.
Oct 82, 87p

This bibliography contains citations concerning studies of seamounts. Geophysics and geochronology of seamounts are included. Magnetic characteristics, surface features, and crust and mantle structures of seamounts are discussed. Causes of earthquakes related to seamounts are included. (Contains 67 citations fully indexed and including a title list.)

8L. Snow, Ice, and Permafrost

AD-A119 632/8 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Acoustic Emissions from Polycrystalline Ice,
William F. St. Lawrence, and David M. Cole. Aug 82, 21p Rept no. CRREL-82-21

The acoustic emission response from fine-grained polycrystalline ice subjected to constant compressive loads was examined. A number of tests were conducted with the nominal stress ranging from 0.8 to 3.67 MPa at a temperature of -5 C. The acoustic emission response was recorded and the data are presented with respect to time and strain. The source of acoustic emissions in ice is considered in terms of the formation of both microfractures and visible fractures that develop without catastrophic failure of the ice. A model to describe the acoustic emission response is developed. (Author)

PB83-109587 PC **A04**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
The Importance of Satisfactory Positioning, Diving and Mapping Systems, Suitable for Exploration and Transportation in Icecovered Sea Areas,
Ragnar Thoren. 1982, 68p FOA-B-60003-M7, ISBN-91-7056-063-3

In an introductory chapter (1) the author presents a general view of the remarkable evolution of the remote sensing technique during the last decades, all of great importance for operations in more or less ice-covered sea areas, especially at the exploration of natural resources, such as oil, gas and minerals, and at surface shipping as well as under-ice navigation. In all cases the best possible position-fixing and a true knowledge of the bathymetry and prevailing ice conditions are necessary. Also included in the report are chapters on: Exploration of the Arctic Ocean; Underwater Pingoes, Offshore Permafrost and Ground Ice; and Underwater Technology.

8M. Soil Mechanics

AD-A119 656/7 PC **A04**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Geotechnical Lab.
Geotechnical Centrifuges Observed in the Soviet Union, 6-29 September 1979.
Final rept.,
Paul A. Gilbert. Aug 82, 73p Rept no. WES/MP/GL-82-8

In 1979 a team of U.S. geotechnical engineers visited to the U.S.S.R. to observe demonstrations of centrifuge devices and to discuss soil modeling techniques with representatives of the Soviet Union. This report presents details of the visit and an assessment of centrifuge modeling research in the Soviet Union. (Author)

PB83-111617 PC **A08**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Prediction of Pore Water Pressure Buildup and Liquefaction of Sands during Earthquakes by the Cyclic Strain Method.
Building science series (Final),
R. Dobry, R. S. Ladd, F. Y. Yokel, R. M. Chung, and D. Powell. Jul 82, 171p NBS-BSS-138
Library of Congress catalog card no. 82-600561. Prepared in cooperation with Woodward-Clyde Consultants, Clifton, NJ., and Rensselaer Polytechnic Inst., Troy, NY. Dept. of Civil Engineering.

A cyclic strain approach for evaluating the buildup of excess pore water pressures and the potential for liquefaction of level sandy sites during earthquakes is proposed in this report. This strain approach is based on the premise that, for undrained loading of sand, there is a predictable correlation between cyclic shear strain and excess pore water pressure; also, that there is a threshold shear strain below which there is no sliding at the contacts between sand particles and no pore water pressure buildup can occur. As the result, a sand deposit will not develop excess pore pressures if the induced seismic shear strain is less than the threshold strain. Both theoretical evidence and experimental verification suppoting the cyclic strain approach and the existence of the threshold, are presented in the report. Based on all there findings, a specific design method is proposed for predicting if excess pore pressures will develop at a specific site during a design earthquake.

PB83-851956 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Soil Studies Related to Metal Additions or Deficiencies. 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Oct 82.
Oct 82, 223p
Supersedes PB82-858754.

This bibliography contains citations concerning metals in soils. Investigations cover the effects of the metals on plants and crops, exchanges and substitutions of one metal for another, mobility of the metals in soils, and long-term accumulation effects. Toxicity of soils, mine spoils, and waste disposal are excluded from this bibliography unless the literature specifically refers to farm crops, livestock forage, or special plant germination studies. (This updated bibliography contains 159 citations, 34 of which are new entries to the previous edition.)

8N. Terrestrial Magnetism

N82-31854/4 PC **A02**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Installation and Calibration of a Geomagnetic Station in Cachoeira Paulista Montagem E Calibracao de Uma Estacao Magneto Telulca Em Cachoeira Paulista.
L. S. V. Dutra, H. Fournier, D. J. R. Nordemann, and N. B. Trivedi. Mar 82, 16p INPE-2337-PRE/084
In Portuguese; English Summary. Sponsored by National Fund for Scientific and Technical Development.

A magnetotelluric station was installed. Simultaneous measurements of horizontal (X, Y) geomagnetic and geoelectric field variations are called magnetotelluric (MT) measurements. A flux gate magnetometer was used to conduct measurements in the period range from 100 seconds to 86400s and an amplifier was constructed to be able to measure N-S and E-W electric field variations in the same period range. Also MT measurements were done in the period range from 0.1 second to 600 seconds employing an induction magnetometer and an adequate amplifier for magnetic and electric field variations, respectively. The constructional details and electronic circuits used for MT measurements are presented here.

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A119 424/0 PC **A08**/MF **A01**
General Electric Co., Binghamton, NY. Armament and Electrical Systems Dept.
Liquid Cooled Variable Speed Constant Frequency (VSCF) Converter Device Development.
Final rept. Sep 78-Dec 81,
John W. Butler. Jun 82, 160p AES-13589, AFWAL-TR-82-2048
Contract F33615-78-C-2029

Further miniaturization of high-power semi-conductor devices utilizing silicon disks larger than 12 mm. requires major innovations to improve the average thermal impedance and surge capability. The high thermal impedance in existing discrete devices is caused mostly by the dry interfaces necessary to provide stress relief. This report presents a unique approach to solving the dry interface problem. It describes the design, fabrication and evaluation of a smaller, lighter, electrically isolated dual thyristor module featuring structured copper, solder bonding, polyimide passivation, direct bonded copper on beryllium oxide and a hermetic sealed aluminum case. Details of the SCR modules evaluation in a 60 KVA single channel VSCF electrical generating system are included. (Author)

AD-A119 548/6 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Electrical Engineering.
Analysis of Slow-Wave Phenomena in Copianar Waveguide on a Semiconductor Substrate.
Technical rept.,
Yoshiro Fukuoka, and Tatsuo Itoh. 29 Apr 82, 3p
Rept no. UT-MW-N-82-4
Contracts N00014-79-C-0553, DAAG29-81-K-0053
Pub. in Electronics Letters, v18 n14 p589-590, 8 Jul 82.

No abstract available.

AD-A119 707/8 PC **A06**/MF **A01**
B-K Dynamics, Inc., Rockville, MD.

Gyrotron Gun Study Report.
J. Mark Baird, and Anthony C. Attard. 18 Sep 81, 112p Rept no. TR-3-476
Contract N00173-79-C-0132

The purpose of the program was to explore new gyrotron gun configurations and to design a low velocity spread replacement gun for the NRL 35 GHz gyro-TWT. The specific beam forming techniques which were studied were magnetic field reversal, transverse magnetic field kicker, and single anode (diode-like) Magnetron Injection Guns (MIGs). This report contains a summary of our work in each of these areas as well as a description of the new MIG design for the gyro-TWT. Gyrotron oscillators and amplifiers require an entirely different type of electron gun design than those normally used in conventional tube designs. The ideal beam must not only have the proper geometry to maximize the rf interaction with the selected waveguide circuit mode, but also, for maximum efficiency, there are two additional requirements: (1) the transverse velocity of the electrons must exceed the longitudinal velocity by a typical factor of 1.5 to 2 (intermixed helical electron trajectories are allowed); and (2) the spread in the longitudinal velocities must be small (on the order of 10-20% for oscillators, 2-5% for amplifiers). Several methods for producing gyrotron beams have been investigated, and most likely different approaches will be necessary for differing power levels and velocity spread requirements.

DE82006309 MF **A01**
GK Technologies, Inc., Edison, NY.
Development of Extruded Dielectric Underground Transmission Cables Rated 138 KV, 230 KV, and 345 KV. Final Report.
G. Bahder, L. A. Bopp, G. S. Eager, C. Katz, and A. Knott. Feb 82, 228p EPRI-EL-428-V.2
Contract AC01-76ET29311
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This report covers the continuation of the work to develop technology to manufacture chemically crosslinked polyethylene insulated power cables in the ac voltage range of 138 kV to 345 kV having insulation thicknesses approximately equal to that of oil impregnated paper insulated cables. It also incorporates the development of field molded splices and terminations for new high voltage stress 138 kV cables. After reviewing the main equipment elements, incorporated in the pilot extrusion line, the special features of this system are noted and a step-by-step description of the cable extrusion process is given. Optimization of the process and introduction of modifications in the equipment culminated with the production of 138 kV cables. Results of laboratory tests to demonstrate the high quality of the cables are given. The development of molded splices and molded stress control cones was initiated with the work on model cables and followed by the making of splices and terminations on 138 kV cables. The molded components are made with the same purified insulating compound as used in the manufacture of the cables. Both the molded splices and the molded stress control cones have been fully tested in the laboratory. Following the completion of the development of the 138 kV cable a high stress 230 kV crosslinked polyethylene cable was developed and optimized. (ERA citation 07:053683)

DE82006310 MF **A01**
Phelps Dodge Cable and Wire Co., Yonkers, NY.
Development of Low-Loss 765-KV Pipe-Type Cable. Final Report.
E. M. Allam. Jan 82, 140p EPRI-EL-2196
Contract AC01-76ET29160
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The successful laboratory development of a 765-kV low-loss high-pressure pipe-type transmission cable and splice, employing an oil-impregnated laminate insulation is described. The laminate is PPP (a polypropylene film sandwiched between two layers of cellulose paper) and the impregnating fluid is hydrogenated polybutene oil. Test results on this cable demonstrated excellent ac and transient electric strength, low dielectric loss and acceptable bending performance. This system appears economically attractive compared to cellulose paper cables at 765 kV. (ERA citation 07:050141)

DE82006811 MF **A01**
Oak Ridge National Lab., TN.
Ternary Gas Dielectrics.
L. G. Chrisophorou, D. R. James, I. Sauers, M. O. Pace, and R. Y. Pai. 1982, 13p CONF-820331-3
Contract W-7405-ENG-26
Conference on gaseous dielectrics, Knoxville, TN, USA, 7 Mar 1982, Portions of document are illegible. Available in microfiche only.

Recent findings on ternary gas dielectrics comprising N sub 2 + SF sub 6 or CHF sub 3 + SF sub 6 and small amounts (1 to 30%) of a strongly electron-attaching perfluorocarbon (PFC) are presented and discussed. Breakdown strengths of such ternary gas dielectrics under cylindrical and point-plane nonuniform dc fields and under impulse stress for total pressures varying from 50 to 600 kPa are reported, along with results on the decomposition products of the SF sub 6 + PFC binary components of the ternary mixtures. On the basis of these data, ternary gas dielectrics are identified which have high dielectric strengths, are relatively free of carbonization, could reduce SF sub 6 toxicity and corrosion problems, and possess improved dc highly nonuniform field and impulse withstand capabilities. A number of these have dew points comparable to or better than pure SF sub 6 over practical pressure ranges and can be economically attractive if the large-scale production of PFCs reduces their present extremely small-scale production cost by a factor of approx. 5 to 10. (ERA citation 07:046617)

DE82014985 MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Calorimetry in Superfluid He II to Measure Losses in Superconducting Magnets.
S. Caspi. Apr 82, 8p LBL-14105, CONF-820546-4
Contract W-7405-ENG-48
International cyrogenic engineering conference, Kobe, Japan, 10 May 1982, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

A method using calorimetry to measure magnet losses in pressurized Helium II is described. The isothermal nature of He II is used in measuring the overall heat capacity of the system and the net refrigeration power. During the measurements, the refrigeration power is held fixed, and the system (400 liters) temperature is near 1.92 K. The calorimetric measurement was calibrated against known power inputs between 1 and 20 W. This technique can even measure heat loads higher than the available refrigeration. Results of loss measurement on two dipole magnets are reported.

DE82903132 MF **A01**
McGraw-Edison Co., Franksville, WI.
Distribution Vacuum-Arc Fault-Current Limiter. Final Report.
L. M. Burrage, P. D. Pedrow, E. F. Veverka, D. R. Landergott, and J. M. Driear. Feb 82, 136p EPRI-EL-2266
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The objective of this project was the demonstration of the feasibility of using a vacuum arc as the basis for a distribution class fault current limiter. The concept used was an electric discharge in vacuum between a hollow cylindrical anode and a short rod cathode located on the axis of the anode. The device has two modes of operation. One mode utilizes an externally applied axial magnetic field; the other uses the discharge's inherent magnetic field. A series of experiments yielded analytic models of the two modes of operation. It was found that for both cases, high arc voltages were generated by the conduction of current through an electron space charge region (sheath) near the anode. It was concluded that the vacuum arc with applied axial magnetic field was the most suitable mode for use as a commutating switch for a switched resistor fault current limiter. The test device used for the project could reliably commutate currents of 6.4 kA peak. The design of a 20 kA peak prototype commutating switch was completed but the prototype was not constructed. This vacuum arc device with applied axial magnetic field may be considered an alternative switching device for dc applications. (ERA citation 07:043293)

PAT-APPL-6-370 312 PC **A02/MF A01**
Department of the Air Force, Washington, DC.
Positive Space-Charge Closing Switch Apparatus.
Patent Application,
James P. O'Loughlin. Filed 21 Apr 82, 18p AD-D009 703/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A positive space-charge closing switch apparatus for closing electrically the gap between a pair of main electrodes with a positive ion beam that is generated by an ion plasma gun. (Author)

PATENT-4 331 956 Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Control Means for a Solid State Crossbar Switch.
Patent,
T. O. Anderson, and A. M. Lovelace. Filed 29 Sep 80, patented 25 May 82, 9p N82-29538/7, PAT-APPL-6-191 744
Supersedes PAT-APPL-6-191 744, N80-33679 (18 - 24, p 3273).Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A control system for a solid state crossbar switch which allows a plurality of switch control and interrogation functions to be implemented by time sharing related circuitry is described. The crossbar switch includes a plurality of X ports and Y ports, each X-Y port intersection designating a specific X-Y intersection latch which controls a plurality of associated switches for interconnecting one set of data lines associated with the X port to another set of data lines associated with the Y port. The control system continuously and sequentially addresses each of the X-Y intersection latches at a 10 megahertz rate. During this addressing, the control circuitry includes a capability for interrogating each intersection latch for determining which are in a set condition, ensuring that only one X-Y intersection latch is set on an X row and Y column defining that latch, resetting all of the X-Y intersection latches, and determining which of the X-Y intersection latches are in a set condition.

PB83-852129 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Thyristors. October, 1978-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Oct 78-Oct 82.
Oct 82, 292p
Supersedes PB80-855711.

This bibliography contains citations concerning research and development of thyristor technology. Thyristor controlled reactors for transmission applications, machine synchronization, thyristor energy consumption effects, current and voltage control devices, motor drive systems and magnetic generators are among the topics discussed. Performance, design, and reliability are included. (This updated bibliography contains 334 citations, 166 of which are new entries to the previous edition.)

9B. Computers

AD-A119 398/6 PC **A02/MF A01**
Army Armament Research and Development Command, Watervliet, NY. Large Caliber Weapon Systems Lab.
SALOME, a Structured and Logically Minimal Ensemble of Programming Constructs.
Final rept.,
Royce W. Soanes, Jr. Jul 82, 23p ARLCB-TR-82021, SBI-AD-E440 160
Presented at Army Numerical Analysis and Computers Conference (1982), 3-4 Feb 82, Vicksburg, MS.

An overview of the Salome structured programming language will be given, along with an appendix briefly describing its syntax and semantics. Salome has been designed with the Fortran programmer in mind. The Salome source language is supported by a translator having a target language of standard Fortran, and Fortran code may be injected into Salome source code

when needed. The Salome translator has been written in Salome and Fortran.

AD-A119 405/9 PC **A07/MF A01**
Fail-Safe Technology Corp., Los Angeles, CA.
U.S. Navy Fault-Tolerant Microcomputer.
Final rept. on Phase 1,
M. W. Sievers, G. A. Kravetz, B. A. Dussia, and J. D. Jackson. Jul 82, 130p
Contract N00014-82-C-0126

This Fail-Safe Technology Report includes the results of a feasibility study, preliminary design and recommendations for subsequent work. Fault tolerance is the unique attribute of a computer system that enables that system to continue its program-specified behavior in spite of the occurrence of faults. This feature is essential and cost-effective in applications where computer failure causes human injury or loss of critical data or equipment. For less critical applications, inclusion of fault detection and diagnostic procedures within the computer itself greatly increases repair time with a concomitant reduction in maintenance cost and downtime. Included in this report are discussions of the applications, tradeoffs and requirements that led to the suggested architecture. An Executive Summary in Section 3 outlines the results of these discussions. The preliminary suggested hardware and software design is then shown. Specific recommendations for direction of further productive efforts are also included in this report. An overview of the state-of-the-art concepts and techniques employed in fault tolerant computer designs is added as Appendix I.

AD-A119 411/7 PC **A03/MF A01**
Naval Postgraduate School, Monterey, CA.
Usability of Military Standards for the Maintenance of Embedded Computer Software.
Final rept. 1 Jan-1 Jun 82,
Norman F. Schneidewind. Jun 82, 27p Rept no. NPS-54-82-005

Several military software standards were examined and evaluated with respect to their applicability and usability for maintaining embedded computer software. These standards included the following: Department of the Navy Tactical Digital System Documentation Standards, SECNAVINST 3560.1; MIL-STD 1679, Navy Military Standard for Weapon System Development; and Weapon Specification 8506. These standards were discussed from three standpoints: (1) the degree to which they support the use of newer software development technologies (e.g., requirements analysis methodologies) for improving software maintenance; (2) the effect of the microcomputer and its software development environment on the application of these standards; and (3) the extent to which these standards enhance traceability (tracing the various levels of related documentation). These aspects required a reevaluation of the applicability of software standards. A recommendation is made to use the A7-E aircraft software redesign project as a model for improving (1) and (3) in the three standards. Item (2) was judged to be not relevant to the development of software standards. (Author)

AD-A119 419/0 PC **A02/MF A01**
Stanford Univ., CA. Dept. of Computer Science.
Using String Matching to Compress Chinese Characters,
Gu Guoan, and John Hobby. May 82, 16p Rept no. STAN-CS-82-914
Contract N00014-81-K-0330, Grant NSF-MCS77-23738
Sponsored in part by Grant NSF-IST79-21977.

A new method for font compression is introduced and compared to existing methods. A very compact representation is achieved by using a variant of McCreight's string matching algorithm to compress the bounding contour. Results from an actual implementation are given showing the improvement over other methods and how this varies with resolution and character complexity. Compression ratios of up to 150 are achieved for Chinese characters. (Author)

AD-A119 439/8 PC **A02/MF A01**
Stanford Univ., CA. Dept. of Computer Science.
Optimal Font Caching,
David R. Fuchs, and Donald E. Knuth. Mar 82, 20p Rept no. STAN-CS-82-901
Contract N00014-81-K-0269, Grant NSF-IST79-21977
Sponsored in part by Grant NSF-MCS77-23728.

An efficient algorithm is presented for communicating letter-shape information from a high-speed computer with a large memory to a typesetting device that has limited memory. The encoding is optimum, in the sense that the total time for typesetting is minimized, using a model that generalizes well-known 'demand paging' strategies to the case where changes to the cache are allowed before the associated information is actually needed. Extensive empirical data shows that good results are obtained even when difficult technical material is being typeset on a machine that can store information concerning only 100 characters. The methods of this paper are also applicable to other hardware and software caching applications with restricted lookahead. (Author)

AD-A119 463/8 PC **A03/MF A01**
Georgia Inst. of Tech., Atlanta. Production and Distribution Research Center.
Travel Time Models for Automated Storage/Retrieval Systems,
Yavuz A. Bozer, and John A. White. May 82, 41p Rept no. PDRC-82-06
Contract N00014-80-K-0709
Prepared in cooperation with SysteCon, Inc., Norcross, GA.

Travel time models are developed for automated storage/retrieval (AS/R) machines. The S/r machine travels simultaneously horizontally and vertically as it moves along a storage aisle. For randomized storage conditions expected travel times are determined for both single and dual command cycles. Alternative input/output (I/O) locations are considered. Additionally, various dwell point strategies for the storage/retrieval machine are examined. (Author)

AD-A119 489/3 PC **A11/MF A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Image Processing Techniques.
Lecture series.
May 82, 235p Rept no. AGARD-LS-119
Presented at a Lecture Series under the sponsorship of the Avionics Panel and the Consultant and Exchange Programme of AGARD, 14-15 Jun 82, Athens, Greece; 17-18 Jun 82, Paris, France; 21-22 Jun 82, The Hague, The Netherlands. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This Lecture Series, following an introductory overview of the field and Lecture Series, commenced with a summary on human visual system capabilities and limitations. Fundamentals of imagery and display were covered, including analog and digital parameters and noise characteristics. Practical aspects included scan conversion, image generation and formatting. A session was devoted to optical image processing, including image enhancement, edge detection, and filtering. Digital image processing, transmission and coding were covered. Image modeling and bandwidth compression were stressed. The Lecture Series concluded with a discussion of hardware and applications. (Author)

AD-A119 500/7 PC **A03/MF A01**
Woods Hole Oceanographic Institution, MA.
WHOI Processed CTD Data Organization.
Technical rept.,
Robert C. Millard, and Nancy Galbraith. Aug 82, 42p Rept no. WHOI-82-37
Contract N00014-74-C-0262, Grant NSF-OCE78-06886

A data storage format has been developed to be used for processed C.T.D. data on the Woods Hole Oceanographic Institution's Digital Equipment Corporation VAX 11 780 computer. CTDVAX as defined in this report is designed as a flexible internal data format. Station data is organized by ship-cruise-project using a VAX-supplied subdirectory system on disk. This report describes the data organization, file structures, and record formats. File naming conventions, data protection and documentation schemes are explained. Outlines are given of the data processing system in use and of the CTD data accessing utilities available on the VAX. (Author)

AD-A119 542/9 PC **A02/MF A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. Computation Mathematics and Logistics Dept.
Computer Center Mass Storage System User's Guide.
Departmental rept.,
Stanley E. Willner. Jul 82, 16p Rept no. DTNSRDC/CMLD-82-19

The Computer Center Mass Storage System user's Guide presents an overview, for the User of the CDC NOS/BE Operating Systems, of the Mass Storage system (MSS) hardware and software. Job control statement syntax and specific examples of job control statements which interface with the MSS are included. (Author)

AD-A119 553/6 PC **A02/MF A01**
Texas Univ. at Austin. Center for Cybernetic Studies.
Chance Constrained Programming Methods in Probabilistic Programming.
Research rept.,
A. Charnes, and W. W. Cooper. Mar 82, 18p Rept no. CCS-RR-427
Contracts N00014-75-C-0569, N00014-81-C-0236
Sponsored in part by Contract MDA903-81-C-0365 and N00014-81-C-0410.

This is a response to the article 'Decision Problems Under Risk and Chance Constrained Programming: Dilemmas in the Transition' (25) in which Professors Hogan, Morris and Thompson (HMT hereafter) recommend abandonment of Chance Constrained Programming (=CCP) in favor of Stochastic Programming with Recourse (=SPR)--which we shall also refer to as 2-stage Linear Programming Under Uncertainty (=LPUU) since this is the main variant of SPR which is relied upon for these conclusions in (25). In the interest of clarity and brevity, we do not pursue all of the topics covered in (25) since, as will become evident, a rather lengthy response is required to chase down even major issues. We also believe that (25) is directed to conceptual rather than practical issues of application and so, also for brevity, we brush aside qualifiers that appear in statements like the following: 'We wish to emphasize that recourse problems characterize almost all (sic) real decision problems involving risk.' Except for possibly affording some degree of protection to HMT, we do not see that such qualifiers serve any useful purpose.

AD-A119 562/7 PC **A06/MF A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Distributed Micro-Processor Applications to Guidance and Control Systems.
Advisory rept.,
Louis J. Urban. Jul 82, 115p Rept no. AGARD-AR-178

The objectives of Working Group 06 were to obtain a better understanding of microprocessor technology developments, and of architecture configurations for NATO guidance and control systems. A lexicon of terms and nomenclatures is provided as well as considerations on standardization options and opportunities.

AD-A119 675/7 PC **A03/MF A01**
University of Southern California, Marina del Rey. Information Sciences Inst.
Program Developments: Formal Explanations of Implementations.
Research rept.,
David S. Wile. Aug 82, 50p Rept no. ISI/RR-81-99
Grant NSF-MCS79-18792

Automated program transformation systems are emerging as the basis for a new programming methodology in which high-level, understandable specifications are transformed into efficient programs. Subsequent modification of the original specification will be dealt with by reimplementation of the specification. For such a system to be practical, these reimplementations must occur relatively quickly and reliably, in comparison with the original implementation. We believe the reimplementation requirement necessitates that a formal document--the program development--be constructed during the development process to explain the resulting implementation to future maintainters of the specification. The overall goal of our work has been to develop a language for capturing and explaining these developments and the resulting implementations. This language must be capable of expressing: the implementor's goal structure, all program manipulations necessary for implementation and optimization, and plans of such optimizations. In this report, we dis-

cuss the documentation requirements of the development process and then describe a prototype system for constructing and maintaining this documentation information. Finally, we indicate the many remaining open issues and the direction to be taken in the pursuit of solutions. (Author)

AD-A119 762/3 PC **A06**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
Protocols of Users Manipulating Visually Presented Information with Natural Language.
Technical rept.,
Candace L. Sidner. Sep 82, 122p Rept no. BBN-5128
Contract N00014-77-C-0378

This document contains a complete set of transcripts for a set of protocols collected at BBN, in the spring of 1980. In all, eight protocols were collected, two preliminary ones and six main ones. The two preliminary protocols are based on the task of designing a 1 bit adder and a 4 bit parallel adder as are three of the main protocols, while the other three make use of KL-1 as a database system with graphic representation. The purpose of these protocols, and hence the design of the tasks, was to obtain data about how people talk about graphically presented material which they are trying to manipulate in some way. In particular, we were interested in the kinds of references people made and what sorts of instructions they gave to the machine. (Author)

AD-A119 801/9 PC **A02**/MF **A01**
Stanford Univ., CA. Project Orion.
Hardware for Kinematic Statistical Graphics.
Technical rept.,
Jerome H. Friedman, and Werner Stuetzle. Nov 81, 19p Rept no. ORION-005
Contracts N00014-81-K-0340, DE-AC03-76SF00515
Sponsored in part by contract DE-AT03-81-ER108-43.

The hardware requirements for a computer graphics system capable of supporting kinematic statistical graphics are specified. The various options are discussed, and the ORION-1 workstation currently in use at the Stanford Linear Accelerator Center is described. (Author)

AD-A119 814/2 PC **A03**/MF **A01**
Stanford Univ., CA. Project Orion.
Smoothing of Scatterplots.
Technical rept.,
Jerome H. Friedman, and Werner Stuetzle. Jul 82, 50p Rept no. ORION-003
Contracts N00014-81-K-0340, DAAG29-82-K-0056
Sponsored in part by Contracts DE-AC03-76SF00515 and DE-AT03-81-ER10843.

A variable span scatterplot smoother based on local linear fits is described. Local cross-validation is used to estimate the optimal span as a function of abscissa value. A rejection rule is suggested to make the smoother resistant against outliers. Computationally efficient algorithms making use of updating formulas and corresponding FORTRAN subroutines are presented. (Author)

DE82005204 MF **A01**
Lawrence Livermore National Lab., CA.
Novel Techniques for Three-Dimensional Data Display.
S. L. Grotch. 11 Dec 81, 40p UCRL-86797, CONF-820703-1
Contract W-7405-ENG-48
Annual conference on computer graphics and interactive techniques, Boston, MA, USA, 26 Jul 1982, Portions of document are illegible.
Available in microfiche only.

Three interactive programs for three-dimensional point or surface representation have been developed providing the user with a broad variety of easily controlled plotting options: projections, gridding, color, least squares data fitting, class distinctions, viewing perspective. These programs, written in FORTRAN for the CDC-7600, use DISSPLA for the three-dimensional graphics. The user may examine the plots in real time, simply change most of the program control parameters, producing new plots, iteratively. These may be edited in real time to yield a variety of graphical outputs. With these programs, the generation of stereo pairs for truly three-dimensional viewing is very simple. A second tool, termed sectioning, has also been implemented. Here, the user specifies a plane through which a set of points in three dimensions is viewed. Along the axis perpendicular to this plane, the points located in a series of user-specified sections are plotted as separate two-dimensional plots. These 2D views can be easily converted into transparent viewgraphs which can then be suspended from a simple wire frame. The assembly produces a very effective poor man's hologram of the original data set. A third program generates a combined surface/contour presentation as seen from any user viewpoint. Here again, under simple user control, a variety of options may be exercised interactively, producing three-dimensional plots with a surface sheet suspended above the corresponding contours drawn below.

DE82005351 MF **A01**
Energy Research and Development Administration, Washington, DC. Div. of Basic Energy Sciences.
General-Purpose Computer Networks and Resource Sharing in ERDA. Volume 2. Implementation of ARPANET Facilities.
15 Jul 77, 51p DOE/ER/70214-T4
Contract AT03-76ER70214
Portions of document are illegible.
Available in microfiche only.

The investigation focused on heterogeneous networks in which a variety of dissimilar computers and operating systems were interconnected nationwide. Homogeneous networks, such as MFE net and SACNET, were not considered since they could not be used for general purpose resource sharing. Issues of privacy and security are of concern in any network activity. However, consideration of privacy and security of sensitive data arise to a much lesser degree in unclassified scientific research than in areas involving personal or proprietary information. Therefore, the existing mechanisms at individual sites for protecting sensitive data were relied on, and no new protection mechanisms to prevent infringement of privacy and security were attempted. Further development of ERDA networking will need to incorporate additional mechanisms to prevent infringement of privacy. The investigation itself furnishes an excellent example of computational resource sharing through a heterogeneous network. More than twenty persons, representing seven ERDA computing sites, made extensive use of both ERDA and non-ERDA computers in coordinating, compiling, and formatting the data which constitute the bulk of this report. Volume 2 discusses technical and financial issues involved in connecting ERDA computer sites to a geographically distributed heterogeneous network. (ERA citation 07:045414)

DE82005352 MF **A01**
Energy Research and Development Administration, Washington, DC. Div. of Basic Energy Sciences.
General-Purpose Computer Networks and Resource Sharing in ERDA. Volume 1. Summary, Conclusions and Recommendations.
15 Jul 77, 28p DOE/ER/70214-T3
Contract AT03-76ER70214
Portions of document are illegible.
Available in microfiche only.

The investigation focused on heterogeneous networks in which a variety of dissimilar computers and operating systems were interconnected nationwide. Homogeneous networks, such as MFE net and SACNET, were not considered since they could not be used for general purpose resource sharing. Issues of privacy and security are of concern in any network activity. However, consideration of privacy and security of sensitive data arise to a much lesser degree in unclassified scientific research than in areas involving personal or proprietary information. Therefore, the existing mechanisms at individual sites for protecting sensitive data were relied on, and no new protection mechanisms to prevent infringement of privacy and security were attempted. Further development of ERDA networking will need to incorporate additional mechanisms to prevent infringement of privacy. The investigation itself furnishes an excellent example of computational resource sharing through a heterogeneous network. More than twenty persons, representing seven ERDA computing sites, made extensive use of both ERDA and non-ERDA computers in coordinating, compiling, and formatting the data which constitute the bulk of this report. Volume 1 summarizes the entire four year investigation into computational resource sharing through heterogeneous computer networks and makes recommendations for the future. (ERA citation 07:045413)

DE82006150 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Modified BITBLT and Related Display Architectures for Rapid Vector Generation.
G. Hamlin. 1982, 11p LA-UR-81-3756, CONF-820703-3
Contract W-7405-ENG-36
Annual conference on computer graphics and interactive techniques, Boston, MA, USA, 26 Jul 1982.

The recently described frame buffer organization making possible the BITBLT operation is analyzed. A modification of this organization and two more related organizations are presented and analyzed. Up to a factor of three speed improvement in vector generation is obtainable with these other organizations.

DE82006156 MF **A01**
Los Alamos National Lab., NM.
Experiences with Distributing Graphic Software Between Processors.
G. Hamlin, and J. E. George. 1982, 17p LA-UR-81-3682, CONF-820703-2
Contract W-7405-ENG-36
Annual conference on computer graphics and interactive techniques, Boston, MA, USA, 26 Jul 1982.
Available in microfiche only.

Software to aid the distribution and coordination of tasks between different processors was developed to distribute applications written in Fortran. This development led to the discovery of problems unique to Fortran and to interesting practical solutions. Two graphical applications were distributed to a variety of machines and machine pairs: CDC 7600-LSI/11, CRAY-LSI/11, VAX 11/780, and Apollo. These distributions pointed out several parameters such as the use of Fortran COMMON, communication parameters, and processing capabilities that can affect the successful distribution of applications.

DE82012294 PC **A18**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Proceedings of the First LBL Workshop on Statistical Database Management.
H. K. T. Wong. Mar 82, 413p LBL-13851, CONF-811208-
Contract W-7405-ENG-48
Workshop on statistical data base management, Menlo Park, CA, USA, 2 Dec 1981, Portions of document are illegible.
Microfiche only after original copies are exhausted.

The workshop on statistical database management was intended to serve as a forum in which users, system builders, and database researchers could exchange ideas on the applications, techniques, problems, and requirements of statistical database management. The term statistical databases refers to databases that represent statistical or summary information and that are used for statistical analysis. Typically, these databases contain quantitative information, such as population counts and combinations of descriptive information, and such as race and sex for each quantitative measure. Individual items from the workshop were prepared separately for the database.

DE82013341 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Interactive Statistical-Distribution-Analysis Program Utilizing Numerical and Graphical Methods.
S. R. Glandon, and D. E. Fields. Apr 82, 90p ORNL-5813
Contract W-7405-ENG-26
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The TERPED/P program is designed to facilitate the quantitative analysis of experimental data, determine the distribution function that best describes the data, and provide graphical representations of the data. This code differs from its predecessors, TEDPED and TERPED, in that a printer-plotter has been added for graphical output flexibility. The addition of the printer-plotter provides TERPED/P with a method of generating graphs that is not dependent on DISSPLA, Integrated Software Systems Corporation's confidential proprietary graphics package. This makes it possible to use TERPED/P on systems not equipped with DISSPLA. In addition, the printer plot is usually produced more rapidly than a high-resolution plot can be generated. Graphical and numerical tests are performed on the data in accordance with the user's assumption of normality or lognormality. Statistical analysis options include computation of the chi-squared statistic and its significance level and the Kolmogorov-

Smirnov one-sample test confidence level for data sets of more than 80 points. Plots can be produced on a Calcomp paper plotter, a FR80 film plotter, or a graphics terminal using the high-resolution, DISSPLA-dependent plotter or on a character-type output device by the printer-plotter. The plots are of cumulative probability (abscissa) versus user-defined units (ordinate). The program was developed on a Digital Equipment Corporation (DEC) PDP-10 and consists of 1500 statements. The language used is FORTRAN-10, DEC's extended version of FORTRAN-IV. (ERA citation 07:045447)

DE82013411 PC A03/MF A01
Hanford Engineering Development Lab., Richland, WA.
Guidelines for Technical Reviews of Software Products.
N. P. Wilburn. Mar 82, 39p HEDL-TC-2132
Contract AC06-76FF02170

A guideline is given for technical review of products developed during a software life cycle. Purposes and benefits of reviews are given. Varieties of reviews, when they should take place, roles of the reviewers and products of the review are described. (ERA citation 07:045418)

DE82013512 PC A03/MF A01
Oak Ridge National Lab., TN.
Portable Software Package for Nonlinear Partial Differential Equations.
J. W. Neuberger, and R. J. Renka. Apr 82, 39p
ORNL/CSD-102
Contract W-7405-ENG-26
Portions of document are illegible.
Microfiche only after original copies are exhausted.

This paper describes a storage-efficient method and associated software package for the solution of a general class of second-order nonlinear partial differencial equations. The method is essentially an iterative scheme for the least squares minimization of a finite different discretization of the residual. The advantages of this approach are its ability to treat a wide range of problems (it is type-independent) and its low storage requirements - O(N) for N grid points. The effectiveness of the method is based on a gradient-smoothing technique which increases the rate of convergence of the iterative procedure. (ERA citation 07:048932)

DE82014628 PC A03/MF A01
Sandia National Labs., Albuquerque, NM.
User's Manual Sandia Logic Simulator (SALOGS) NETWRK Program.
J. M. Acken, and J. D. Stauffer. Mar 82, 31p SAND-81-0060
Contract AC04-76DP00789

The SAdia LOGic Simulator version 4 (SALOGS-4) enables the user to determine the response of a digital circuit with very good accuracy and an economical expediture of computer time. Most digital circuits are easily modeled, using either basic building-block gates or functional elements. Input signals to drive the network are generated and simulation is controlled by means of a language called Simulation Control Language (SCL). This manual describes the use of the first step in SALOGS NETWRK. The NETWRK program is run iteratively until all circuit description errors are corrected and a table description of the circuit in an internal format has been generated.

DE82902601 PC A03/MF A01
Mathematisch Centrum, Amsterdam (Netherlands).
Checking Whether Programs Are Correct or Incorrect.
R. J. R. Back. Sep 80, 39p MC-IW-144/80
U.S. Sales Only.

A program is considered as consisting of two parts, an algorithm part and a specification part, where the latter records the programmer's intentions as to how the algorithm should work. The question of what is a proper notion of semantic correctness for such programs is discussed, the emphasis being on finding a criterion which supports the construction and maintenance of correct programs. For a suitable notion of semantic correctness, a system to check it for programs is described. This system will either declare a program to be semantically correct, or it will show it to be incorrect by exhibiting a semantic error. (ERA citation 07:045442)

N82-31960/9 PC A09/MF A01
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Fundamentals of Mathematical Analysis for Digital Computers, Volume 2 Fundamentos de Analise Numerica Para Computadores Digitais Volume 2.
C. J. Zamlutti. Feb 82, 192p INPE-2327-MD/017
In Portuguese; English Summary.

Under the denomination of direct methods, a set of methods is collected for the theory of approximations. The set is characterized by the possibility of obtaining, a priori, the amount of work required for a derived accuracy. In the methods presented, the quality can be determined directly by the approximated error limits.

N82-31971/6 PC A02/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
A Generalized Memory Test Algorithm.
E. J. Milner. Jul 82, 11p NAS 1.15:82874, E-1250, NASA-TM-82874

A general algorithm for testing digital computer memory is presented. The test checks that (1) every bit can be cleared and set in each memory work, and (2) bits are not erroneously cleared and/or set elsewhere in memory at the same time. The algorithm can be applied to any size memory block and any size memory word. It is concise and efficient, requiring the very few cycles through memory. For example, a test of 16-bit-word-size memory requries only 384 cycles through memory. Approximately 15 seconds were required to test a 32K block of such memory, using a microcomputer having a cycle time of 133 nanoseconds.

N82-31972/4 PC A04/MF A01
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A Translator for the Sequel 2/Query Language Um Tradutor Para a Linguagem Sequel 2/Query.
M.S. Thesis - 1981.
O. M. Deoliveira. Mar 82, 75p INPE-2351-TDL/083
In Portuguese; English Summary.

The project and construction of the data interfaces for Burroughs' machines (series B7000/B6000) relational data base system, called Sistema Relacional are described. The system simplifies the users' data access. This system is supported by the Burroughs' DMS 2 package. In the Sistema Relacional, information retrievel is accomplished with the high-level SEQUEL 2/ QUERY language.

N82-31973/2 PC A05/MF A01
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Spatial Feature Extraction in Multispectral Images Extracao E Atributos Espaciais Em Imagens Multiespectrais.
M.S. Thesis.
L. V. Dutra. Feb 82, 97p INPE-2315-TDL/078
In Portuguese; English Summary.

Feature extraction is an important factor in determining the precision that can be attained on the classification of multispectral images. The traditional point by point classification methods do not use all the available information since they disregard the spatial relationship that exists among pixels belonging to the same class. Methods are developed to extract image spatial features by means of liner and nonlinear filtering. Feature selection methods are also developed, since it is not possible to use all the generated features because physical restrictions, computational costs and availability of training patterns do not allow the manipulation of a large number of extracted image features. The classifier that is used assumes that the features have a Gaussian distribution although the use of nonlinear filters does not guarantee the normality of the resulting features. Therefore, nonlinear transfer functions are employed as an attempt to restore the Gaussian character of the involved features. The analysis of the performance of the spatial features in conjunction with the spectral ones demonstrated that the use of spatial information increases the precision of the classifications.

N82-31989/8 PC A02
Fondazione Ugo Bordoni, Rome (Italy).
The Use of Theoretical Transfigurations for the Implementation of Fast Convolutions on Microprocessors USO Delle Trasformate Teoretiche Per l'implementazione di Convoluzioni Veloci Su Microprocessori.
M. Salerno. Dec 81, 14p FUB-35-1981
Text in Italian.

An algorithm based on the Fourier transformation, able to reduce sustantially the number of operations involved in the calculation of a discrete convolution is described. By this method both the signal and the sampled pulse response are transformed, the sequences are multiplied, and then the inverse transform gives the outlet convolution sequence. Generalized Fourier transforms, operating with whole numbers only, are used. It is shown that by the use of these transformations, only shift operations are required, and no round-up errors are involved.

N82-31990/6 PC A02/MF A01
Fondazione Ugo Bordoni, Rome (Italy).
The Representation of Communication Protocols: An Algorithm to Transform Finite State Machines in Petri Nets Sulla Rappresentatione Dei Protocolli di Comunicazione: Un Algoritmo di Trasformazione di Macchine a Stati Finiti in Reti di Petri.
A. Pattavina, and S. Trigila. Apr 82, 24p FUB-6-1982
Text in Italian.

A general correspondance between a finite state machine model and a Petri net model was established in order to develop an automatic procedure to transform a finite state machine model of the communication protocols in a Petri net model. The correspondance is based on the concept of attainable graphs, i.e., a representation of the global dynamic evolution of a Petri net. An algorithm to generate attainable graphs is proposed, and a correspondance between the Petri net obtained in that way and the finite state machine is identified. An automatic computer transformation procedure is proposed and an application example is given.

N82-31991/4 PC A03/MF A01
Foersvarets Forskningsanstalt, Stockholm (Sweden).
A Presentation of Two Models for Pictorial Edge Detection.
U. Nilsson, S. Nyberg, and J. O. Eklundh. May 82, 29p FOA-C-30275-E1

Algorithms in which an edge detector operates on the image three times, varying the size of the Gaussian operator, are presented. By comparing the different outputs, the number of possible edge points can be reduced. In the first algorithm, different types of thresholding of each output, and of a combination of the three outputs, are used. The second algorithm assumes that a blurred edge can be treated as a sharp edge convolved with a Gaussian point spread function. This assumption leads to a system of equations with three equations and two unknowns: the magnitude of the edge, and the value of sigma for the point spread function. If the system of equations can be solved, the point is treated as an edge point, unless the magnitude and sigma fail to pass given thresholds. Outputs for three different pictures are presented.

N82-32003/7 PC A02/MF A01
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
The Finite Element Machine: An Experiment in Parallel Processing.
O. O. Storaasli, S. W. Peebles, T. W. Crockett, J. D. Knott, and L. Adams. Jul 82, 19p NAS 1.15:84514, NASA-TM-84514

The finite element machine is a prototype computer designed to support parallel solutions to structural analysis problems. The hardware architecture and support software for the machine, initial solution algorithms and test applications, and preliminary results are described.

N82-32004/5 PC A14/MF A01
Ecole Nationale Superieure des Telecommunications, Paris (France).
Fault Testing and Performance Measuring in Microprocessor Communication Networks.
Ph.D. Thesis.
W. Boghdady. Oct 81, 319p ENST-E-81003

A technique for fault diagnosis in data networks, which inserts test/monitoring frames (TMF) between data

frames, is presented. The TMF contents when analyzed by a test/monitoring unit located at each node, are used to detect failures, deliver the recovery, and control data flow. Implementation of the technique in a network consisting of stations interconnected by coaxial cables in a ring topology is described. Testing of front end systems, and on-line oriented testing of a microprocessor via the application programs are treated.

PAT-APPL-6-365 857 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
A Handprinted Symbol Recognition System.
Patent Application,
Jerry H. Ross. Filed 21 Apr 82, 15p AD-D009 711/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention provides a handprinted symbol recognition system for identifying, through computer techniques, free-form, unconstrained handprinting in which the accuracy is decoupled from the efficiency. A thin-line (skeletonized) figure output from a preprocessing system, in the form of an array of 'black' image points from a raster line sampling, is converted into segment-oriented lists. The segment-oriented lists are filtered and data compressed to obtain a reduced, more suitable subset of points approximating the symbol for further processing. The topologic features of the image are extracted from the subset. Short segments that are potential spurs are removed, the image is rotated as necessary and normalized as to size. Each segment and their interrelationships are analyzed to extract geometric features for use in conjunction with the topologic features in a logic tree decision mechanism. The logic tree decision mechanism is a three-module approach: (1) pre-recognition (trash filter), (2) potential symbol identification, and (3) final quality assurance. The pre-recognition modules separates all possible non-meaningful images from those the recognition system has a chance of identifying with minimal misclassification.

PAT-APPL-6-370 310 PC **A03**/MF **A01**
Department of the Navy, Washington, DC.
A Split-Bus Multiprocessor System.
Patent Application,
Jerry Ross. Filed 5 Apr 82, 28p AD-D009 692/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A split-BUS multiprocessor system for acquiring data and outputting the data in digital computer format has an electronic front end that receives data from one or more sensors and converts the data to digital form. An acquisition microprocessor operating in a polling mode acquires the digital data and stores it in a data memory. An output microprocessor operating in an interrupt mode extracts the data from the data memory and routes it to appropriate display and recording devices in digital computer format. (Author)

PAT-APPL-6-388 574 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Kalman Filter Preprocessor.
Patent Application,
Michael K. Giles. Filed 15 Jun 82, 21p AD-D009 698/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An optical signal preprocessor for computing the input functions required to utilize an extended Kalman filter algorithm. An incoming stream of time-varying images is integrated to form a reference image, which is then subtracted from each subsequently sampled image. The result is digitized for use with the extended Kalman filter algorithm. The reference image is also fed through a spatial filter and then input to two light valve image subtraction systems to produce difference image approximations of two partial derivatives. These derivative functions are then digitized and utilized as inputs to the extended Kalman filter algorithm. (Author)

PB83-107003 PC **A03**/MF **A01**
SoHaR, Inc., Los Angeles, CA.
Computer Science and Technology: The Introduction of Software Tools.
Final rept.,
Herbert Hecht. Sep 82, 44p NBS-SP-500-91
Library of Congress catalog card no. 82-600577.

From a survey of current tool usage it is concluded that the greatest obstacles to effective use of software tools are encountered in organizations employing fewer than 40 programmers, and the needs of these environments are therefore emphasized. Specific needs for software tools in programming for management information systems and for scientific applications are discussed. Measures are described to overcome organizational obstacles to use of tools, to deal with problems arising from the tools, and to reduce the difficulties posed by existing computer installations. Steps required for the successful introduction of tools are organized in two ways: by the function responsible for their accomplishment, and by the time schedule in which they must be completed. The detail work to be performed in each step is described.

PB83-107516 PC **A03**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
Een Overzicht van Beeldplaatspelers en een Voorbeeld van de Aansluiting van een Speler of een CAI-System (A Survey of Video-disc Players and an Example of the Hook-up of a Player to a CAI-System).
Final rept.,
Charles van der Mast. 1982, 26p 82-13
Text in Dutch.

This report on video-disc systems discusses the various video-disc players, how they work and what possibilities they have. It also treats the technical aspects of connecting the Philips very long play system to the modular CAI system of Delft. The report contains an explanation of the Philips video-disc microdot system for video and audio reproduceable on any standard color TV, but does not go into the optical-digital recording (ODR) which is still under development. The video-disc systems of other countries are briefly described and comparisons made. It also contains a description and methods of application of a second category of players equipped with a microprocessor and programmable memory which can be loaded with a program from a disc. A third category is made up of microcomputer controlled players which offer extensive integration possibilities. Discussions of editing systems, CAI video-discs, modular CAI systems and connections arrangements follow. Several pages of bibliography are provided.

PB83-107557 PC **A05**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Onderafdeling der Wiskunde en Informatica.
Cursusmateriaal bij de ADA cursus op 19 en 20 maart 1981 (Computer Course Material to be Taught at ADA on 19 and 20 March 1981.
Interim rept.
1981, 91p 81-17
Text in Dutch.

The computer programming symbols and languages of ADA are compared with those of PASCAL. ASA exercise examples entailing many forms of math problems presented with the procedures to be followed and a commentary thereto. A compilation of computer time costs are also discussed. The ADA languages offer the following possibilities: physical separation of the parts of the program, support of separation between use and implimentation, library facilities for the user, control of higher language program attributes over and beyond program parts borderlines. In ADA programs certain parts of the program called tasks can be carried out asynchronously.

PB83-109660 PC **A08**/MF **A01**
MITRE Corp., McLean, VA.
Summary of Responses to the Software Technology Initiative Questionnaire,
Eric D. Siegel. May 82, 157p MTR-82W00085
Contract F19628-82-C-0001
See also AD-A102180.

This document summarizes responses to the Software Technology Initiative (STI) questionnaire. The STI is part of a comprehensive DoD software R&D effort to achieve order-of-magnitude improvements in software productivity, reliability, and maintainability for military systems. The questionnaire provided a means for respondents to suggest and rank software problem areas and possible STI thrusts.

PB83-110601 PC **A03**/MF **A01**
MITRE Corp., McLean, VA.
Ada (Trade Mark) Validation Organization: Policies and Procedures,
Thomas H. Probert. Jun 82, 37p MTR-82W00103
Contract 196268-82-C-0001

Ada is the mandated common high order language for use in future DoD embedded computer systems development. An Ada Validation Organization has been proposed to ensure that Ada compilers implement the standard Ada language specification. This report defines the recommended policy and procedure guidelines, organizational structure and implementation options for the validation organization.

PB83-851816 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Computer Programming Languages for Numerical Control. 1972-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1972-Oct 82.
Oct 82, 186p
Supersedes PB82-854696.

This bibliography contains citations concerning computer programming and languages to generate data for control of machine tools. These software routines apply to numerically controlled machines used for shaping, punching, and cutting. Some of the referenced literature addresses special programming languages for three axis machine tools, flexible production, and temperature compensation for tool location. The emphasis in this bibliography is on developed languages and systems, although there are also many abstracts on design principles to aid in developing an appropriate language. (This updated bibliography contains 224 citations, 55 of which are new entries to the previous edition.)

PB83-851824 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Computer Programming Languages for Numerical Control. 1975-October, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Oct 82.
Oct 82, 171p
Supersedes PB82-854688.

This bibliography contains citations concerning computer programming and languages to generate data for control of machine tools. These software routines apply to numerically controlled machines used for shaping, punching, and cutting. Some of the referenced literature addresses special programming languages for three axis machine tools, flexible production, and temperature compensation for tool location. The emphasis in this bibliography is on programming language design principles and machine operator-generated programs, although descriptions of already-developed languages form the content of much of the literature abstracted. (This updated bibliography contains 187 citations, 42 of which are new entries to the previous edition.)

PB83-851931 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Minicomputers. October, 1977-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Oct 77-Oct 82.
Oct 82, 259p
Supersedes PB80-856826.

This bibliography contains citations concerning the design, development, and applications of minicomputers. Minicomputer and microprocessor comparisons and contrasts; and minicomputer reliability, performance evaluations, and capacity levels are discussed. Utilization in such areas as medicine, fluid dynamics, oil industry and mining applications, and information and office systems are discussed. Discussions on minicomputer software are included. (This updated bibliography contains 298 citations, 98 of which are new entries to the previous edition.)

PB83-851949 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Computer Architecture. April, 1978-October, 1982 (Citations from the NTIS Data Base).
Rept. for Apr 78-Oct 82.
Oct 82, 329p
Supersedes PB80-856750.

This bibliography contains citations concerning the latest advances in the field of computer architecture. Articles contained cover the design of a large variety of computer systems, microcomputer components, and digital networks. (This updated bibliography contains 277 citations, 77 of which are new entries to the previous edition.)

PB83-852236 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Finite Element Analysis: Computerized Three Dimensional. 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Oct 82.
Oct 82, 150p
Supersedes PB82-859414.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning computerized simulation, mathematical modeling, computer codes, and calculations used in three-dimensional finite element analysis of stresses, structures, reactor kinetics, and the mechanics of fluids, soils, and rocks. The analysis relates chiefly to energy facilities and equipment or apparatus. (This updated bibliography contains 135 citations, 18 of which are new entries to the previous edition.)

9C. Electrical and Electronic Engineering

AD-A119 518/9 PC **A04**/MF **A01**
Naval Facilities Engineering Command, Alexandria, VA.
Electrical Engineering. Electrical Utilization Systems. Design Manual-4.4.
Final design criteria.
Dec 79, 52p Rept no. NAVFAC-DM-4.4
Supersedes Chapter 4 of Rept. no. NAVFAC-DM-4 dated Mar 74 and Change 1 dated Aug 74.

Basic design guidance developed from extensive re-evaluation of facilities is presented for use by experienced architects and engineers. The contents cover electrical utilization considerations such as interior electric power, lighting, communication, signal and fire alarm systems; emergency electric power systems; roadway, protective and area lighting; and criteria for earthquake areas design. (Author)

DE82007937 MF **A01**
Main (Charles T.), Inc., Charlotte, NC.
Final Report for Development of New-Conductor Concepts for HVAC Overhead-Electric-Power Transmission.
Dec 81, 168p DOE/RA/50253-1
Contract AC02-80RA50253
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The status of attempts and techniques to reduce audible noise and corona generation and losses in EHV AC overhead power transmission lines in general is reviewed. A number of other promising concepts are identified. The correspondence between available audible noise test data, calculated design data, and actual in-service performance of operating EHV lines is reviewed and found to be generally satisfactory. The results of a limited comparative audible noise and corona loss test on some promising concepts are given, together with a description of the simplified parallel cage facility employed. The economic analysis computer program is developed to calculate transmission line costs for 345, 500, 765 and 1100kV conventional lattice and compacted cross-cable structure concepts. Since the optimization of conductor designs for EHV and UHV structure concepts has great effect on the total transmission line cost, the electrical, structural and environmental variables influencing the line cost have been included in this program such that economic analysis of various conductor options could easily be made. (ERA citation 07:046620)

DE82903144 PC **A06**/MF **A01**
Ebasco Services, Inc., New York.
Lightning Research Plan. Final Report.
D. A. Mark. Mar 82, 121p EPRI-EL-2289

The application of effective lightning protection depends to a great extent on a good working knowledge of the number and characteristics of the lightning strokes reaching earth. Research projects using state-of-the-art instrumentation can establish a valid data base of lightning stroke characteristics all over the territory of the US enabling the utilities to improve their surge protection. The improved knowledge of lightning stroke characteristics will be a starting point in establishing better lightning protection schemes and improved analytical methods for lightning protection. The objective of this project is to prepare a comprehensive, coordinated and cost effective plan for undertaking future lightning research projects that will be applicable to the improvement of distribution system surge protection. The main investigative work of the project included the following: state of the art study in lightning research to determine the availability of lightning stroke data and instruments for data gathering; the use of analytical methods in distribution system surge protection and the need for further analytical work; and identification of research performed by others and its applicability to the utility industry. The results of these investigations are used in the proposed research plan that incorporates the recommended projects, identifies priorities and expected costs. (ERA citation 07:043294)

PAT-APPL-6-393 169 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Electrical Method of Making Conductive Paths in Silicon.
Patent Application,
Clyde H. Lane. Filed 28 Jun 82, 17p AD-D009 695/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method of forming an electrical conductive path between parallel surfaces of a substrate is disclosed wherein a pulsed voltage, non-current limited, power supply causes aluminum to electro-migrate between at least two opposing points to form an alloy with the silicon of the substrate. Electronic devices can be thus contacted through said conductive path and thus placed upon opposite sides of the substrate for purposes of packaging, shielding, etc. (Author)

9D. Information Theory

AD-A119 521/3 PC **A04**/MF **A01**
San Diego State Univ., CA. Dept. of Mathematical Sciences.
Signal Detection for Spherically Exchangeable (SE) Stochastic Processes.
Technical rept.,
C. B. Bell. Aug 82, 70p Rept no. 4-82
Contract N00014-80-C-0208

Signal detection problems with spherically exchangeable (Gaussian, conditionally Gaussian, and non-Gaussian) background noise are treated. Techniques for both historical data and cross-sectional data are developed using sufficient statistics and statistical noise. Extensions of the Kolmogorov-Smirnov statistic are employed. Each technique is illustrated by a numerical example. (Author)

AD-A119 522/1 PC **A03**/MF **A01**
San Diego State Univ., CA. Dept. of Mathematical Sciences.
Inference for Weibull-Type Poisson Processes (Estimation and Signal Detection).
Technical rept.,
S. M. Lee, and C. B. Bell. Aug 82, 40p Rept no. 5-82
Contract N00014-80-C-0208

Signal detection is studied in the context of Weibull-type non-homogeneous Poisson processes. Inference for the one- and two-parameter cases is treated for four different sampling plans- Type I- and Type II- censoring; same-shape and same-distance sampling. Extensions of the Kolmogorov-Smirnov statistic are employed as well as techniques based on the likelihood function. (Author)

AD-A119 528/8 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
Signal Estimation from Short-Time Spectral Magnitude.
Technical rept.,
Syed Hamid Nawab. May 82, 95p Rept no. TR-494
Contract N00014-81-K-0742, Grant NSF-ECS80-07102

This thesis shows that in many practical situations the processing of a discrete-time signal can be accomplished using only the magnitude of its short-time spectrum. Mild restrictions on the signal and on the analysis window of the short-time spectrum are shown to be sufficient for unique signal representation with the short-time spectral magnitude. Furthermore, various algorithms are developed which reconstruct the signal from appropriate samples of the short-time spectral magnitude. Some of these algorithms are designed to obtain signal estimates from the processed short-time spectral magnitude, which generally does not have a valid short-time structure. These algorithms are successfully applied to the time-scale modification and noise reduction problems in speech processing. However, the results presented here have similar potential for other application areas, including those with multidimensional signals. (Author)

PB83-852277 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hilbert Transformations for Communications and Information Theory. June, 1972-October, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 72-Oct 82.
Oct 82, 81p
Supersedes PB82-856188.Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

This bibliography contains citations concerning the derivation and applications of Hilbert transformation in communications and information theory. The subject matter covers linear and non-linear transformations for causality, estimation problems, filtering, control, solutions of integral equations, and abstract methods of analyzing partial differential equations. The transformation to Hilbert space allows elimination of complexity, redundancy, and irrelevancy in computer and mathematical equations for signal detection, signal processing, optical and radio communications, and radio filter design. (This updated bibliography contains 75 citations, 22 of which are new entries to the previous edition.)

PB83-852285 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hilbert Transformations for Communications and Information Theory. 1976-October, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1976-Oct 82.
Oct 82, 84p
Supersedes PB82-856204.

This bibliography contains citations concerning the derivation and applications of Hilbert transformations in communications and information theory. Topics include linear and non-linear transformations for causality, estimation problems, filtering, control, solutions of integral equations, and abstract methods of analyzing partial differential equations. The transformation to Hilbert space allows elimination of complexity, redundancy, and irrelevancy in computer and mathematical equations for signal detection, signal processing, optical and radio communications, and radio filter deisgn. A few reports reference applications to medical diagnostics and industrial ultrasonic detection for material testing. (This updated bibliography contains 73 citations, 13 of which are new entries to the previous edition.)

9E. Subsystems

AD-A119 663/3 PC **A15**/MF **A01**
Palisades Inst. for Research Services, Inc., New York.

IEEE Conference Record of 1980 Fourteenth Pulse Power Modulator Symposium, 3-5 June 1980.
1980, 340p Rept no. 80-CH-1573-5-ED

Symposia included papers on: Spark Gaps; Thyratrons; General Switching; Systems; Components; Modulators; Mark Generators; Magnetic Insulation; Power Conditioning/Regulation; Kickers; and Accelerators.

AD-A119 664/1 PC **A16/MF A01**
Palisades Inst. for Research Services, Inc., New York.
IEEE Conference Record of 1982 Fifteenth Power Modulator Symposium, 14-16 June 1982.
1982, 352p Rept no. 82-CH-1785-5

The 1982 Fifteenth Power Modulator Symposium is the latest in a series beginning with the Hydrogen Thyratron Symposium in 1950. These conferences have provided early views of the evolution of devices and technologies in the modulator field. As part of the Symposium, information is presented on recent trends associated with repetition-rated pulsed modulators, including switches, auxiliary devices, energy storage, power conditioning, RF systems, accelerators, lasers and low-frequency generators.

AD-A119 766/4 PC **A05/MF A01**
Naval Postgraduate School, Monterey, CA.
Impact of VHSIC Technology on Battle Zone Material Management.
Master's thesis,
Thomas Hewitt Hicks. Jun 82, 97p

A new era in military microelectronics is unfolding. The Department of Defense, in 1979, initiated a six-year tri-service Very High Speed Integrated Circuits (VHSIC) Program that will develop a new technology base for integrated circuits. This program has the potential of producing systems-on-a-chip capability. VHSIC, with its high density circuits, promises drastic reductions in size, weight, and power requirements, while still yielding higher levels of reliability and performance. (Author)

DE82013000 **MF A01**
Sandia National Labs., Albuquerque, NM.
Survey of IIR Adaptive Filtering Algorithms.
S. D. Stearns, R. A. David, and D. M. Etter. 1982, 3p
SAND-82-0995C, CONF-820549-1
Contract AC04-76DP00789
International symposium on circuits and systems, Rome, Italy, 10 May 1982, Portions of document are illegible.
Microfiche copies only.

Several adaptive algorithms for IIR filters have been presented in recent years. These algorithms can be categorized as gradient search or non-gradient search. We present here an example in which a non-quadratic, multimodal error surface is possible. In particular, a case is presented which models a fourth-order FIR plant with a two-pole adaptive IIR filter. The resulting error surface has three distinct minima. Using this example, we compare the NRLMS (gradient search) algorithm with the Genetic (non-gradient search) Algorithm. A combination of the two algorithms is then presented which has improved performance over the individual algorithms. (ERA citation 07:044437)

N82-31584/7 PC **A06/MF A01**
NTL, Inc., Commack, NY.
A New Antenna Concept for Satellite Communications.
G. Skahill, and D. Ciccolella. Jun 82, 111p NAS 1.26:167924, NASA-CR-167924
Contract NAS3-22887

A novel antenna configuration of two reflecting surfaces and a phased array is examined for application to satellite communications and shown to be superior in every respect to earlier designs for service to the continental United States from synchronous orbit. The vignetting that afflicts other two reflector optical systems is eliminated by use of a reflecting field element. The remaining aberrations, predominantly coma, are isolated in the time delay distribution at the surface of the array and can be compensated by ordinary array techniques. The optics exhibits infinite bandwidth and the frequency range is limited only by the design of the array.

N82-31585/4 PC **A07/MF A01**
Case Western Reserve Univ., Cleveland, OH. Inst. of Technology.
Coaxial Prime Focus Feeds for Paraboloidal Reflectors.
R. E. Collin, H. Shchilling, and L. Hebert. Jul 82, 138p NAS 1.26:167934, NASA-CR-167934
Contract NAS3-22342

A TE11 - TM11 dual mode coaxial feed for use in prime focus paraboloidal antenna systems is investigated. The scattering matrix parameters of the internal bifurcation junction was determined by the residue calculus technique. The scattering parameters and radiation fields of the aperture were found from the Weinstein solution. The optimum modeing ratio for minimum cross-polarization was determined along with the corresponding optimum feed dimensions. A peak cross-polarization level of -58 dB is predicted. The frequency characteristics were also investigated and a bandwidth of 5% is predicted over which the cross-polarization remains below -30 dB, the input VSWR is below 1.15, and the phase error is less than 10 deg. Theoretical radiation patterns and efficiency curves for a paraboloidal reflector illuminated by this feed were computed. The predicted sidelobe level is below -30 dB and aperture efficiencies greater than 70% are possible. Experimental results are also presented that substantiates the theoretical results. In addition, experimental results for a 'short-cup' coaxial feed are given. The report includes extensive design data for the dual-mode feed along with performance curves showing cross-polarization as a function of feed parameters. The feed is useful for low-cost ground based receiving antennas for use in direct television satellite broadcasting service.

N82-31609/2 PC **A03/MF A01**
Fondazione Ugo Bordoni, Rome (Italy).
Antenna Polarization Characteristics and the Method for Its Determination Caratteristiche di Polarizzazione Delle Antenne E Metodologia Per Il Loro Rilevamento.
E. Carli. Dec 81, 28p FUB-45-1981
Text in Italian.

Methods for measuring and representing the polarization characteristics of antennas with elliptic polarization are described. The characteristics of an elliptically polarized wave were determined measuring at least two field components and the phase difference between them. The polarization state is described by a tensor where the modulus and the phase determine the polarization characteristics. The tensor is represented by a complex plane where each point of the plane corresponds to one of the possible polarization states. Several measuring methods are reviewed including the measuring of linear components, the measuring of the circular components and the measuring of three amplitude rates. Interference and calibration problems related to those measurements are discussed.

N82-31619/1 PC **A04/MF A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Three Section 240 Mhz Helical FM Filter Filtro Helicoidal de Tres Secoes FM 240 Mhz.
S. Koshima. Feb 82, 52p INPE-2313-NTE/179
Text in Portugese.

The design of a three section helical filter operating in 240 MHz is presented. Experimental results confirmed the exceptional quality of this type of filter, characterized by low loss. Without extreme care, a filter was obtained with insertion loss under 0.6 dB, good flatness in the passband, and a stopband attenuation greater than 50 dB. With the gilding of the helical spiral and covering of the filter body with alodine it was possible to achieve a filter with insertion loss less than 0.3 dB.

N82-31630/8 PC **A02/MF A01**
Fondazione Ugo Bordoni, Rome (Italy).
Multiport Module-2 Generators of Pseudorandom Binary Sequences.
O. Brugia, M. Pioli, and W. Wolfowicz. Mar 82, 6p FUB-3-1982

A pseudorandom binary sequences generator which works at suitable reduced rates is described. The proposed device reduces problems presented at high bit rates by the two port feedback shift registers combined in a module two adder. When the needed reduction rate is an integral power of two, the problem can be solved by using a module two sequential network with L outlet ports. This generates sets of L binary symbols at the rate f/L, multiplexed impulse response is equal to that of the two port feedback shift register working at the rate f. A procedure of synthesis of these multiport generators is detailed.

N82-31631/6 PC **A02/MF A01**
Fondazione Ugo Bordoni, Rome (Italy).
Average Power Density Spectrum at the Output of Two-Port Strictly-Recursive Modulo-2 Sequential Networks.
O. Brugia, G. Campanini, S. Improta, and W. Wolfowicz. Feb 82, 6p FUB-4-1982

Autocorrelation and average power density spectrum at the output of two port strictly recursive module two sequential networks are expressed as a function of the impulse response period, of the number of ones included in a single period, and of the input statistics. A model of the network consisting of M delayers, M binary scalers and a module two adder and the input output equations is described. The average power density spectrum at the output of class four partial response coders, and the average power density spectrum of a scrambler AMI coder cascade are examined.

N82-31632/4 PC **A04/MF A01**
Sheffield Univ. (England). Dept. of Control Engineering.
Non-Linear Circuit Mode Analysis.
D. A. Linkens. Mar 82, 67p RR-177

The theoretical analysis of circuits comprising sets of intercoupled nonlinear oscillators was reviewed. Mathematical modeling of biomedical systems, particularly for the electrical activity of the gastrointestinal digestive tract, is discussed. A matrix linearization method was developed, and applied to a wide range of structures comprising chains, arrays, rings and tubes. Different coupling components, including pure time delay, and two types of van der Pol oscillator dynamics were investigated. Numerous mode patterns were predicted and experimentally observed, and stability criteria were established for a wide range of conditions. The multioscillator mode analysis entails matrix mode decoupling followed by equivalent linearization similar to the Krylov-Bogolioubov approach.

N82-31961/7 PC **A06/MF A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Construction of the Wefax/Inpe Converter Construcao Do Conversor Wefax/Inpe.
H. Aranha, and R. Tank. Feb 82, 103p INPE-2334-NTE/180
In Portuguese; English Summary.

A complete description of the WEFAX/INPE converter for processing signals from the GEOS and METEOSAT geostationary satellites is presented. The converter receives signals at 1690.1 MHz and converts them to 135.6 MHz, providing signal compatible with the APT image reception system. Assembly and adjustment procedures applicable to industrial scale production are provided. A description and schematics for the entire system from the 3 m diameter paraboloid antenna to the display device producing the images are given. Conversion, input, and control units are described.

N82-32089/6 PC **A02/MF A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Computer Simulation of the Blumlein Pulse Forming Network.
C. B. Edwards. Mar 81, 13p DE81-700292, RL-81-029

A computer simulation of the Blumlein pulse-forming network is described. The model is able to treat the case of time varying loads, non-zero conductor resistance, and switch closure effects as exhibited by real systems employing nonohmic loads such as field emission vacuum diodes in which the impedance is strongly time and voltage dependent. The application of the code to various experimental arrangements is discussed, with particular reference to the prediction of the behavior of the output circuit of 'ELF', on an electron beam generator. The output from the code is compared directly with experimentally obtained voltage waveforms applied to the 'ELF' diode.

PAT-APPL-6-351 831 PC **A02/MF A01**
Department of the Navy, Washington, DC.

A Coaxial Waveguide Commutation Feed Network for Use with a Scanning Circular Phased Array Antenna.
Patent Application,
Edward P. Irzinski. Filed 24 Feb 82, 17p AD-D009 689/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A dominant TEM mode and a pair of spatially orthogonal TE11 modes suitably excited at the input ports of a coaxial waveguide commutator portion of a coaxial waveguide commutation feed network are employed to generate a commutatable low-sidelobe amplitude distribution at symmetrically disposed peripheral output ports of the coaxial waveguide commutator. The resulting low-sidelobe amplitude distribution can be used to feed radiating elements of an associated circular phased array antenna. The coaxial waveguide commutator is configured, inter alia, with a linearly tapered inner conductor surrounded by a uniform tube outer conductor to achieve a smoother TEM-dominant mode characteristic impedance transition from the input port plane to the output port plane thereof. Employment of this feed geometry, in conjunction with balanced four-port feeding of the coaxial waveguide commutator which inhibits the higher order TE modes, increases the bandwidth capability while maintaining low insertion loss. (Author)

PAT-APPL-6-388 327 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
High Sensitivity Millimeter-Wave Measurement Apparatus.
Patent Application,
T. T. Mori. Filed 14 Jun 82, 17p AD-D009 697/4
Availability: This government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A millimeter wave measurement apparatus utilizing a phase-locked transmitter to generate a millimeter wave-signal and a phase-locked local oscillator receiver to receive the transmitted millimeter wave signal. A conventional microwave receiver unit receives the IF signal from the millimeter wave receiver and downconverts the IF signal for detection and measurement. (Author)

PAT-APPL-6-389 139 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Low Sidelobe, High Efficiency Mirror Antenna.
Patent Application,
Dean D. Howard, and David C. Cross. Filed 15 Jun 82, 9p AD-D009 714/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invection relates generally to antennas for radiofrequency energy, and more particularly to antennas required to produce electromagnetic beams over wide angles of coverage volume. The mirror antenna employs a continuous mirror without a hole. A feed horn and an electromagnetic lens, located behind a rotatable twist reflector (the mirror), collimates a beam toward a polarized reflector located near the twist reflector and tilted to aim energy toward the twist reflector. Energy reflected back toward the polarized reflector from the twist reflector passes through the polarized reflector to free space.

PAT-APPL-6-393 265 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
FET Switching Regulator.
Patent Application,
Daniel G. Miller. Filed 29 Jun 82, 24p AD-D009 706/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The high voltage field effect transistor has a drive circuit for pulse width modulation, which includes a small transformer coupled to the gate and source with a diode in series at the gate, so that a very short on-drive pulse charges the gate capcitance, and the charge is held by the diode. Another FET has its output connected between the gate and source of the high voltage FET, and its input coupled to another small transformer so that it is turned on for a short time by a very short off-drive pulse to discharge the gate capacitance and thus turn off the high voltage FET. A transformer drive circuit includes two one-shot devices connected to the pulse width modulator as leading and trailing edge detectors respectively, with their outputs connected via FET's to the on-drive and off-drive transformer primaries respectively, to provide pulses of 100-200 nanoseconds. (Author)

PAT-APPL-6-394 039 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Isolated Load Switching with Surge Suppression.
Patent Application,
Thomas G. Bezdek. Filed 30 Jun 82, 19p AD-D009 702/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Relay contacts provide the principal switching between a D.C. power source and the load. An SCR in series with a limiting resistor by phases the relay contacts during initial turnon to absorb the inrushing surge to capacitors of the load. Optical couplers provide isolation from a remote control. A transistor blocking oscillator is coupled between one optical coupler and the trigger of the SCR for turn-on. Delay timing includes a collector-base capacitor at a transistor of the other optical coupler. A Zener diode couples the timing circuit to a transistor amplifier, which operates the relay. The turn-on circuit is then disabled. A turn-off pulse to the second optical coupler turns off the transistor amplifier, which opens the relay. (Author)

PATENT-4 336 616 Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Discriminator Aided Phase Lock Acquisition for Suppressed Carrier Signals.
Patent,
L. M. Carson, and F. E. Krasin. Filed 15 Dec 78, patented 22 Jun 82, 6p N82-29539/5, PAT-APPL-969 762
Supersedes PAT-APPL-969 762-78, N79-14276 (17 - 05, p 0585).Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A discriminator aided technique for acquisition of phase lock to a suppressed carrier signal utilizes a Costas loop which is initially operated open loop and control voltage for its VCXO is derived from a phase detector that compares the VCXO to a reference frequency thus establishing coarse frequency resolution with the received signal. Then the Costas loop is closed with the low-pass filter of the channel having a bandwidth much greater (by a factor of about 10) than in the I channel so that a frequency discriminator effect results to aid carrier resolution. Finally, after carrier acquisition, the Q-channel filter of the Costas loop is switched to a bandwidth substantially equal to that of the I-channel for carrier tracking.

PB83-851386 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Data Display Devices. April, 1978-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Apr 78-Oct 82.
Oct 82, 266p
Supersedes PB80-856693.

This bibliography contains citations concerning the design, applications, and precision of data display devices. Topics include applications for computers, color displays, simulator visual systems. L.E.D. displays, and human and biomedical engineering. (This updated bibliography contains 252 citations, 52 of which are new entries to the previous edition.)

9F. Telemetry

N82-31614/2 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).
Concatenated Coding on a Spacecraft-to-Ground Telemetry Channel: Method.
M. R. Best, and H. F. A. Roefs. 6 Aug 81, 12p NLR-MP-81048-U
Presented at Intern. Colloq. On Inform. Theory, Budapest, 24-28 Aug. 1981.

Techniques for encoding and decoding in a concatenated coding scheme consisting of a convolutional inner code and a Reed-Solomon outer code were evaluated. The Reed-Solomon code has length 256, dimension 224, and is defined over an alphabet of 257 elements. Fermat number transform, long division, Berlekamp's algorithm, Euclidean algorithm, continued fraction expansion, and Chien search are discussed. A combination of techniques that meets the operational constraints, and that is best suited for the code under consideration in terms of logical and computational complexity is presented.

10.

ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

DE82005298 MF **A01**
Purdue Univ., Lafayette, IN. Dept. of Agricultural Economics.
Demonstration of the Potential for Energy Conservation in Several Food-Processing Plants. Final Report, December 15, 1977-December 31, 1980.
M. R. Okos, J. S. Marks, and T. Baker. 15 Oct 81, 486p DOE/CS/40048-2
Contract AS02-77CS40048
Portions of this report are illegible.
Best available copy from document source. Available in microfiche only.

A detailed energy audit was performed on an operating fluid milk plant with a 1979 production of 12.33 million gallons. Approximately 52% of the fuel energy was lost to inefficient boiler operation. About 40% of the electrical demand is from refrigeration compressors. A detailed evaluation was made of various energy saving options. The process heat requirements can be economically decreased to 8.4 billion Btu from the present 26.4 billion Btu's. Similarly it was found that 1.15 million kWh of electricity could be saved based on the 1979 consumption load. Using various heat recovery options, it was found, while maintaining the normal investment criterion, the boiler fuel requirement could be decreased to less than 1 billion Btu's per year. (ERA citation 07:050767)

DE82007236 PC **A04**/MF **A01**
Pennsylvania Univ., Philadelphia. Dept. of Mechanical Engineering and Applied Mechanics.
Design of a 30-HP Solar Steam-Powered Turbine. Topical Report.
R. P. Kroon, C. A. Meyer, N. Lior, and H. Yeh. May 80, 60p DOE/ET/20110-3
Contract AC03-78ET20110
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The type-selection and complete design of a 30hp turbine which operates on superheated steam are described. The steam obtains most of its energy (the latent heat of vaporization) from solar energy at approximately 100 exp 0 C (design) and is then superheated by a fuel energy source to 600 exp 0 C (design). The turbine is designed for an exit pressure of 10.086 kPa(abs) corresponding to a condenser temperature of 46 exp 0 C (115 exp 0 F), as required for air-cooled condensers. The turbine selected is of counter-rotation radial outflow design, employing 10 rows of reaction-type blading, and it operates at 15300 rpm (design). The calculated turbine efficiency at design conditions is 75%, well above the efficiency of existing steam turbines of same power and steam conditions. Extensive calculations of the turbine efficiency at off-design conditions indicate a very small deterioration in efficiency, of the order of a few percent, over the practical range of operations. (ERA citation 07:042907)

DE82007753 MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Simplified Thermal Parameters: A Model of the Dynamic Performance of Walls.
M. H. Sherman, J. W. Adams, and R. C. Sonderegger. Dec 81, 29p LBL-13503, CONF-811222-2
Contract W-7405-ENG-48
Energy conservation in the 80's conference, Clearwater, FL, USA, 8 Dec 1981, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

In-situ measurement of wall thermal performance entails two problems: (1) selecting a technique for measuring time-varying surface temperatures and heat fluxes on both sides of the test wall and (2) reducing this data set into a small number of parameters that characterize the wall. The first problem is addressed by the Envelope Thermal Test Unit (ETTU), consisting of two four-foot by four-foot blankets placed on either side of the test wall that are used to both measure and control the surface heat fluxes and temperatures of the wall. Dynamic measurements always require specifying a driving cycle to get the dynamic characteristics from the test wall. The choice of a preferred dynamic cycle is addressed, and a pink-noise driving cycle is chosen to maximize the amount of information from a given test. To analyze the data gathered by ETTU a simplified dynamic model was developed that describes the thermal performance of a wall by a small number of parameters: a steady-state conductance, a time constant, and some storage terms; these parameters are called Simplified Thermal Parameters (STPs). The ability of this model to simulate actual wall performance is demonstrated by comparison to results generated with conventional response-factor methods. The model is used to analyze the behavior of a theoretical multi-layer wall whose properties have been specified by a response-factor calculation. (ERA citation 07:043983)

DE82007756 PC **A13**/MF **A01**
Eaton Operating Co., Inc., Houston, TX.
Crown Zellerbach Well No. 2, Livingston Parish, Louisiana. Volume I. Completion and Testing. Final Report.
1981, 298p DOE/ET/27081-8-V.1
Contract AC08-80ET27081
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The Crown Zellerbach Well No. 2, approximately 23 miles east of Baton Rouge, Louisiana, is the eighth successful test of a geopressured-geothermal aquifer under the DOE Wells of Opportunity program. The well was tested through the annulus between 7-inch casing and 2-3/8 inch tubing. Two flow tests and one reservoir pressure buildup test were conducted on the lower zone during a 13-day period. A total of 12,489 barrels of water was produced. The highest flow rate achieved was about 3887 BWPD. One flow test followed by a buildup period was conducted on the combined upper and lower zones during a 3-day period. A total of 4739 barrels of water was produced. The highest flow rate achieved was about 3000 BWPD. The gas/water ratio measured during testing was about 32.0 SCF/BBL for the lower zone. The extrapolated latoratory data indicates that the solubility of the gas is 55.7 SCF/BBL. It appears that the reservoir brine is considerably undersaturated. The methane content of the flare line gas averaged 71.0 mole percent. Crown Zellerbach Company carefully studied the commercial feasibility of using the well to produce energy for a wood-drying facility and decided against the project. (ERA citation 07:043085)

DE82007905 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Computer Program for Analyzing the Energy Consumption of Automatically Controlled Lighting Systems. Final Report.
Jan 82, 98p LBL-13894, EEB-L-82-02
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche only after original copies are exhausted.

A computer code to predict the performance of controlled lighting systems with respect to their energy-saving capabilities is presented. The computer program provides a mathematical model from which comparisons of control schemes can be made on an economic basis only. The program does not calculate daylighting, but uses daylighting values as input. The program can analyze any of three power input versus light output relationships, continuous dimming with a linear response, continuous dimming with a non-linear response, or discrete stepped response. Any of these options can be used with or without daylighting, making six distinct modes of control system operation. These relationships are described in detail. The major components of the program are discussed and examples are included to explain how to run the program. (ERA citation 07:043985)

DE82007934 PC **A07**/MF **A01**
Sandia National Labs., Livermore, CA.
Testing and Evaluation of Second-Generation Heliostat Mirror Modules.
V. P. Burolla, and W. R. Delameter. Jan 82, 140p SAND-81-8263
Contract AC04-76DP00789
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The testing and evaluation of the Second Generation Heliostat mirror modules are reported here. It was found that all of the previous design problems of mirror modules, such as silver corrosion, thermal defocus, and high glass stress, were eliminated by one or more of these designs. The single most important conclusion to be drawn from this program is that laminated glass mirror module designs are the most technically conservative; it is Sandia's recommendation that this concept be used for near-term applications. Two other Second Generation designs were found to have potential for reduced weight and improved performance, but one design required some significant design changes, and both require further outdoor testing to better estimate their lifetime potential. (ERA citation 07:043057)

DE82008208 PC **A07**/MF **A01**
Washington State Univ., Pullman. Coll. of Engineering.
Midway Community Energy-Conservation Study.
J. S. Englund, A. J. Flechsig, F. W. Cook, B. Kirkpatrick, and J. Zieman. Dec 81, 132p DOE/BP-78
Contract AC79-79BP14779
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The purpose of this project was to study the effects of certain energy conservation modifications to houses at Midway, Washington. The installation costs of the modifications were considered in order to determine whether the modifications were cost effective. Eighteen houses were studied. A computerized data recording system has been installed in the community which measures the same variables for every house. In 1979 a base year of data was recorded when all the houses were unmodified. At the end of 1979 twelve of the eighteen houses were modified, six with an insulation increase and six with the same insulation increase plus installation of storm doors and windows. These three groups were analyzed by two methods which are: (1) by comparing 1979 energy usage with 1980 energy usage normalized on a degree day basis for a particular house, (2) by a statistical analysis of groups which tests whether the energy usage means for each group were different from one another after the modifications were installed. The results showed that both modifications saved substantial amounts of energy with the insulation plus storm doors and windows saving the larger amount. Also, both modifications were deemed to be cost effective if the present power rate is approximately $0.02 per kWh or higher. An increasingly higher present power rate shows an increasingly greater magnitude of cost effectiveness. (ERA citation 07:050713)

DE82008271 MF **A01**
Drexel Univ., Philadelphia, PA. Dept. of Electrical and Computer Engineering.
Study of Control Problems in Active Solar Systems. Final Report.
P. R. Herczfeld, and R. Fischl. Nov 81, 66p DOE/CS/30200-T1
Contract AC03-79CS30200
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The main objective of the work was to investigate the reliability and efficiency of controllers for solar applications. Accurate dynamic distributed parameter model for the collector loop consisting of collector, piping, heat exchanger and storage were developed. A computer program capable of accurately tracing the collector loop performance in time and space under stochastic deriving functions were developed and its accuracy carefully verified against test cases. The computer program was augmented by a color graphic display. Criteria were developed for selecting control set points for efficient reliable controller operation. The effect of sensor location on controller performance was studied. Finally, experiments were performed at the Middlebury test facility and the control models were validated to a high degree of accuracy.

DE82008481 MF **A01**
Solar Energy Research Inst., Golden, CO.
High-Intensity Flux Mapper for Concentrating Solar Collectors.
T. W. Cannon, and H. W. Gaul. Feb 82, 13p SERI/TP-215-1509, CONF-8110154-2
Contract AC02-77CH00178
Solar Thermal Test Facility Users Association meeting, Albuquerque, NM, USA, 26 Oct 1981, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The flux mapper consists of a ceramic scatter plate, video camera with silicon diode array image tube (vidicon), 75 mm focal-length lens with appropriate filters, video frame store, television monitors, disk drive, magnetic tape drive and minicomputer. The camera and scatter plate are installed on a parabolic solar collector at SERI's Advanced Component Research Facility. Calibration was made by focussing the sun directly onto the vidicon target. Light intensity calibration is estimated to be accurate to about 7%. (ERA citation 07:049896)

DE82008608 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Geothermal Applications for a Tannery.
E. G. DiBello. Feb 82, 14p EGG-GTH-5575
Contract AC07-76ID01570
Portions of document are illegible.
Available in microfiche only.

The tanning process and associated energy requirements are summarized. It appears that a significant economic impact may be possible if a shallow hydrothermal resource of approximately 150 to 170 exp 0 F (66 to 77 exp 0 C) were found, and the fluids were cascaded to produce the temperatures necessary for the various tanning operations. The hydrothermal energy would have to be cost competitive with the rapidly escalating fossil energy costs. Although one would need to thoroughly analyze the technical, environmental, and economic issues of such an application, this initial review indicates a good match between the process and potential hydrothermal resources. (ERA citation 07:050001)

DE82009009 MF **A01**
Department of Energy, San Francisco, CA. San Francisco Operations Office.
Territorial Energy Assessment. Phase I.
31 Jul 81, 307p DOE/NBM-2009009
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The goal of the project is to provide a current perspective on territorial energy problems, to identify existing energy supply and demand data, and to identify energy resources that might be developed and appropriate technology options. The cost of the technical assessment and economic analysis activities required to support the development of specific energy plans is defined and estimated. Information is summarized for the US Territories, the Pacific Trust Territories, and Puerto Rico. An overview and analysis of the the Pacific Island Entities; profiles of the Pacifc Island Entities; and the Caribbean Island Entities are presented. (ERA citation 07:047093)

DE82011455 MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Geothermal Probabilistic Cost Model with an Application to a Geothermal Reservoir at Heber, California.
L. H. Orren, G. M. Ziman, and S. C. Jones. 15 Dec 81, 69p DOE/ET/37116-1, JPL-PUB-81-117
Contract AI03-79ET37116
Portions of document are illegible.
Available in microfiche only.

A financial accounting model that incorporates physical and institutional uncertainties has been developed

for geothermal projects. Among the uncertainties it can handle are well depth, flow rate, fluid temperature, and permit and construction times. The outputs of the model are cumulative probability distributions of financial measures such as capital cost, levelized cost, and profit. These outputs are well suited for use in an investment decision incorporating risk. The model has the powerful feature that conditional probability distribution can be used to account for correlations among any of the input variables. The model has been applied to a geothermal reservoir at Heber, California, for a 45-MW binary electric plant. Under the assumptions made, the reservoir appears to be economically viable. (ERA citation 07:043121)

DE82011485 PC **A05**/MF **A01**
Simpson Weather Associates, Charlottesville, VA.
Feasibility Study of a Solar and Wind Powered Desalinization Device (SOWIDE). Final Report.
M. Garstang, D. C. David, and J. W. Snow. Jun 80, 99p DOE/ET/23112-80/1
Contract AC06-79ET23112
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The scope, need and feasibility of a solar-wind desalinization (SOWIDE) system is examined. A climatological study shows the scope and need where a water deficit, a saline source and solar and wind power coincide. Representative stations around the globe serve as examples. When climatological data are used, relatively few locations meet all requirements. Optimization of wind and solar energy through careful site selection would, however, greatly extend the use of an alternate energy powered desalinization system such as SOWIDE. The technical feasibility of SOWIDE is described in terms of the conceptual design which uses solar energy to heat impounded water, saturating a volume of air above the impoundment at the temperature of the water. The water vapor is extracted by condensation through a wind powered refrigerator. Latent heat is returned to the impoundment by the refrigerator fluid with additional heat provided by a pre-heater using heat from the brine discharge and by a resistance heater or stirrer driven by the wind generator. The important considerations of the design include the joint use of solar and wind power, optimization of the heat balance and the fact that the system operates at a low temperature which inhibits scaling and efficiency losses. Results show that the system will deliver 1 m exp 3 d exp -1 of fresh water at operating temperatures of 42 to 70 exp 0 C. At an operating temperature of 60 exp 0 C, the total power required is about 8 kW, equally partitioned between the solar and wind inputs. The operating temperatures and power requirements suggest that the SOWIDE system is technically feasible. Application of the system must await the testing of a prototype and an economic study. (ERA citation 07:053423)

DE82012231 MF **A01**
Lawrence Livermore National Lab., CA.
Energy Management Processes in Japan: Public and Private Sectors.
Y. Kishimoto. 30 Mar 82, 248p UCRL-15449
Contract W-7405-ENG-48
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This study examines Japan's response to recent shifts in the world energy market with particular emphasis on policies relating to the use of coal. Coal was selected as the principal focus for two reasons: (1) it provides an excellent case study in which to examine the factors that shape official policies and industrial behavior; and (2) future demand for coal in Japan entails importance consequences for other nations, including the United States, China and Australia. The study examines - and challenges - the conventional wisdom about the way energy decisions are made in Japan and the relationship between the government and the private sector. The study addresses four broad questions: how are energy-related decisions made in Japan; how should one interpret official statistics, forecasts and policies; what are the priorities of Japan's current energy strategy and what steps are being taken to realize announced goals; and what is the role of coal in Japan's overall energy strategy. (ERA citation 07:043868)

DE82012584 MF **A01**
New York State Energy Office, Albany.
Energy Consumption in New York City. Phase I: Patterns and Opportunities.
1981, 101p DOE/CS/40282-T1
Contract FG01-78CS40282
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Energy consumption data for 1979 shows that New York City's dependence on oil is an excessive 71% compared to a national share of 44%. The city's vulnerability to price and supply changes makes energy planning essential. An analysis of the data indicates that New Yorkers can reduce their energy expenditures during the 1980s from $88 billion to $64 billion by adopting alternative energy sources and implementing energy-efficient measures with little investment and short payback periods. Opportunities for savings can be identified using the consumption data, which is organized by economic sector and by fuel type. A critical factor is that the city produces little primary energy, so much of the expenditures for energy leave the economy. The report concludes that, while a mix of strategies is needed to minimize negative impacts, comprehensive strategic planning to overcome the barriers to energy efficiency will have social and economic benefits. 152 references, 9 figures, 27 tables. (ERA citation 07:043891)

DE82013203 MF **A01**
Donovan, Hamester and Rattien, Inc., Washington, DC.
Solar and Conservation News Items, March 1980.
1 Apr 80, 35p DOE/CS/20059-T18
Contract AC01-78CS20059
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The texts of items dealing with solar energy and energy conservation appearing in the Conservation News Items for March 7 to March 31, 1980 are presented.

DE82013205 MF **A01**
Donovan, Hamester and Rattien, Inc., Washington, DC.
Organize and Administer a Two-Day Working Confrence on Innovative Policies for Spurring Conservation in the Transportation Sector. Task XI.
30 Sep 79, 16p DOE/CS/20059-T11
Contract AC01-78CS20059
Available in microfiche only.

Three papers are presented stressing policies that would result in energy conservation in the transportation sector. Powered roadways for trucks; commercialization of new materials (lightweight plastics, metal-coated plastics, and composites based upon graphite or glass) for transportation systems; and commuter vanpooling are discussed.

DE82013206 MF **A01**
Donovan, Hamester and Rattien, Inc., Washington, DC.
Local Energy Management and Neighborhood Revitalization: The Role of Responsibility Assumption, Exercise and Discharge. Task XIII.
15 Sep 79, 16p DOE/CS/20059-T13
Contract AC01-78CS20059
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The status of urban housing, particularly its deterioration, is reviewed. It is contended that a new approach to housing development must be found; emphasis must be shifted from the satisfaction of the needs of the low-income residents for decent housing conditions to that of promoting occupants' assumption, exercise, and discharge of the personal responsibility for securing, maintaining, and improving their dwelling places. Attitude, knowledge, motivation, skills, and means (elements of the revised approach to housing developments) and their ramifications are discussed in detail.

DE82013209 MF **A01**
Donovan, Hamester and Rattien, Inc., Washington, DC.
Alternative Energy Technology Market Activity. Task XIX.
30 Apr 80, 59p DOE/CS/20059-T16
Contract AC01-78CS20059
Portions of document are illegible.
Available in microfiche only.

A brief overview is presented of the market status of various alternative energy technologies in the US. The nature and sources of data available to characterize current market conditions and to estimate the level of sales of these technologies are described. An overview of the solar market is presented, including the following technologies: solar thermal (low and intermediate temperature applications); passive solar; photovoltaics; wind; and biomass.

DE82013210 MF **A01**
Donovan, Hamester and Rattien, Inc., Washington, DC.
Assist in Developing the Rationale for the Near and Long-Range Conservation R and D Strategy in the Private Sector. Task IX.
31 Aug 79, 17p DOE/CS/20059-T9
Contract AC01-78CS20059
Portions of document are illegible.
Available in microfiche only.

The impact that private sector energy conservation research, development, and demonstration would have on increasing energy prices and decreasing availability of energy supplies is discussed. A description of decision making on investment and research and development in the private sector is given. General arguments supporting the conclusion that the private sector may develop and utilize mid- and long-term conservation technologies, but not always in a timely fashion, are discussed. Also, arguments specifically applicable to the industrial, buildings and community systems, and transportation sectors are analyzed.

DE82013214 PC **A02**/MF **A01**
Donovan, Hamester and Rattien, Inc., Washington, DC.
Management Options for Implementing a Basic and Applied Research Program Responsive to CS Technology Base Needs. Task VIII. Review Existing CS Materials R and D Programs.
28 Feb 80, 12p DOE/CS/20059-T8
Contract AC01-78CS20059

Possibilities for setting up a basic and applied research program that would be responsive to the Conservation and Solar energy base needs are considered with emphasis on the area of materials research. Several organizational arrangements for the implementation of this basic and applied research program are described and analyzed. The key functions of the system such as resources allocation, and program coordination and management follow from two fundamental characteristics: assignment of lead responsibility (CS and the Office of Energy Research, ER); and nature of the organizational chain-of-command. Three options are categorized in terms of these two characteristics and discussed in detail. The first option retains lead responsibility in ER, with CS personnel exercising sign-off authority and filling the coordination role. Option 2 places lead responsibility with CS program office management, and utilizes the existing chain-of-command, but adds a Basic and Applied Research Division to each program office. Option 3 also places lead responsibility with CS, but within a new Office of Basic and Applied Research, which would include a Research Coordinator to manage interactions with ER, and Research Managers for each CS program area.

DE82013221 PC **A03**/MF **A01**
Donovan, Hamester and Rattien, Inc., Washington, DC.
Analysis of Regional Banks' Efforts to Promote Energy Conservation among Commercial Customers. Task II.
30 Oct 79, 33p DOE/CS/20059-T3
Contract AC01-78CS20059

The study approach explored the hypothesis that regional banks can play an important role in disseminating energy conservation information to their commercial/industrial customers. The four phases of the study are described in detail.

DE82013332 MF **A01**
Jet Propulsion Lab., Pasadena, CA.

Annual Technical Report: Fiscal Year 1981.
15 Mar 82, 29p DOE/JPL-1060-51, JPL-PUB-82-22
Contract AT04-81AL16228
Best available copy from document source. Available in microfiche only.

The activities of the JPL Solar Thermal Power Systems Parabolic Dish Project are summarized for FY 1981. Included are discussions on subsystem designs of concentrators, receivers, engines, power converters, and thermal transport. Analyses and test results are also included along with progress on field tests, Small Community System development and the Parabolic Dish Test Site. (ERA citation 07:046296)

DE82013379 MF **A01**
Mathtech, Inc., Princeton, NJ.
Analysis of Energy and Utility Service Demands.
Oct 78, 226p DOE/CS/20082-T2
Contract AC05-76CS20082
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The collection, analysis, and review of existing data on a community's service requirements are documented. The research focused on the analysis of energy-using activities including both micro activities such as space heating, cooking, lighting, and transportation; and macro activities such as providing shelter, health care, education, etc. The technical report describes the analytical framework developed for community description; describes an indexing system by which a catalog of services can be accessed; illustrates the application of the data to an existing community; and provides ancillary information on data availability. A catalog of data is presented which includes several sets of indices which facilitate access of data using various keys. Abstracts of 48 data sources are analyzed. Each abstract includes a description and evaluation of the data, a sampling of that data, an assessment as to how that data may be applied to other analyses, and a reference where the user can secure additional data. (ERA citation 07:044090)

DE82013532 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Collector Trade-off Study for BDM PRDA-35 Application.
Mar 82, 68p SAND-81-7176
Contract AC04-76DP00789
Portions of document are illegible.
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An analysis was made by BDM to compare the performance of the T-600 and T-700 linear parabolic collectors from Solar Kinetics Inc. This study was undertaken as an attempt to prevent an increase in the cost of the BDM PRDA-35 contract in the face of a substantial increase in the cost of photovoltaic cells. Electrical and thermal properties were examined using the Photovoltaic Transient Analysis Program (PVTAP) and results were corelated with existing experimental data. This study indicated that the T-700 collector would yield a slightly more cost-effective system than would the T-600 collector.

DE82013706 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Economic Impact of State-Ordered Avoided Cost Rates for Photovoltaic-Generated Electricity.
D. Bottaro, A. Cox, and N. J. Wheatley. Jul 81, 23p
MIT-EL-81-027
Contract AM01-76EI02295

The Public Utility Regulatory Policies Act (PURPA) of 1978 requires that electric utilities purchase electricity generated by small power producers (QFs) such as photovoltaic systems at rates that will encourage the development of new energy technologies. The Federal Energy Regulatory Commission's regulations for PURPA require state regulatory authorities to ensure that utilities pay their full avoided costs to the QFs for the energy and capacity provided. The various methods are examined that the states have devised to implement the federal policy, particularly the methods chosen for setting buy-back rates. The rates ordered by the states were based on the widely accepted method for determining avoided costs, and the states have approached the problem in a number of ways. Several states' actions are compared, with rates estimated using utility expansion and rate-setting models, and the impact on the potential break-even capital costs of a photovoltaic system is determined using models which calculate photovoltaic worth. It is concluded that PURPA has increased the potential for the development of photovoltaics somewhat by guaranteeing the purchase of PV-generated electricity at a minimum price. Much of the benefit comes from guaranteeing utility purchase of photovoltaic power rather than from higher buy-back rates paid by the utility. However, there is little agreement among the states as to the correct method for setting avoided-cost buy-back rates. The models and techniques used in this analysis and developed at the M.I.T. Energy Laboratory offer a possible solution for estimating buy-back rates. (ERA citation 07:042739)

DE82013987 PC **A02**/MF **A01**
Mega Engineering, Silver Spring, MD.
Adjustable Focussing Concentrator (AFC). First Quarterly Progress Report.
29 Jan 82, 7p DOE/CS/15072-T2
Contract FG01-81CS15072

Initial technical work to review the configuration of the adjustable focusing concentrator (AFC) parabolic trough collector designs and ancilliary components is reported. The reflector substrate would be comprised of a thin glass back surface mirror which is epoxy mounted to a thin gauge steel support plate. The support for the reflector is an open space frame. The receiver system is an evacuated tube corrosion resistant steel tube and fin mounted in a glass tube. Work on development of the support and drive system and on value engineering is reported. Several potential applications have been identified - primarily in high temperature food processing and preparation and in the solar heating and cooling areas for high temperature retrofit hydronic and absorption applications. A brief management report is included.

DE82014135 MF **A01**
Mega Engineering, Silver Spring, MD.
Adjustable Focusing Concentrator (AFC). Second Quarterly Progress Report.
5 May 82, 15p DOE/CS/15072-T1
Contract FG01-81CS15072
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Technical work is reported on developing a parabolic trough collector reflector substrate. Also reported is work on the preliminary design for a revised support system and value engineering efforts. Tabulated are industries which are involved with energy use in several general temperature ranges, with the amount of energy consumed in each range indicated. The most promising applications for the adjustable focusing concentrator are found to be in food processing and industrial process steam. Joint efforts have been proposed in both areas with several organizations. A description and specifications are given for the Mega Sunseeker 40/10 concentrating collector system. A brief management report is also included.

DE82014673 MF **A01**
Purdue Electric Power Center, Lafayette, IN.
Impact of Electric-Vehicle Deployment on Load-Management Strategies: Institutional Issues.
G. T. Heydt. Dec 81, 43p DOE/CS/54250-4, PCTR-111-81, TR-EE---81-48
Contract AS02-77CS54250
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The intention of the work was to examine the relationship between electric vehicle deployment particularly at demonstration sites, and load management strategies. The several complex, interrelated issues studied are summarized in two reports of which this is the second. In this first report, the technical issues have been isolated for presentation. The concentration in that report is on load factor, peak generation, economic operation, fuel cost, percent penetration of electric vehicles, and related questions. The second report focuses on a perhaps more difficult area: the institutional and economic issues. While these issues can not be divorced from technical factors, for purposes of organization of the reports on this work, the dichotomy has been made.

DE82014912 PC **A06**/MF **A01**
Oak Ridge Associated Universities, Inc., TN.
Cost of Electric-Power Interruptions to Residences in the Tennessee Valley.
R. W. Gilmer, and R. S. Mack. Mar 82, 111p ORAU/IEA-82-4(M)
Contract AC05-76OR00033
Portions of document are illegible.
Microfiche only after original copies are exhausted.

This report assesses the cost of electric power outages to residential customers of the Tennessee Valley Authority (TVA). The assessment focuses primarily on costs associated with rationing electric power by means of rotating blackouts of 1 to 3 h, exercised several times per year and perhaps as often as once each month. The cost of these blackouts is assessed in terms of several measures of lost consumer's surplus and lost production within the home. Estimates are developed by season for the typical home, for homes in different parts of the Tennessee Valley, and for homes with different mixes of appliances. Estimates for a typical home in the TVA region vary from 20 cents to 50 cents per kilowatthour depending upon the season and the method of measurement used. These valuations for the TVA region are compared to cost estimates for the US as a whole. The implications of outages lasting longer than 3 h are considered, and costs sustained in such outages are outlined.

DE82015142 PC **A04**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Experimental Performance Evaluation of Line-Focus Sun Trackers.
R. C. Gee. May 82, 64p SERI/TR-632-646
Contract AC02-77CH00178
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Two sun trackers have been tested for tracking accuracy on an sun tracker. Both performed well during the entire test period. Their tracking performance as a function of insolation level was established, and their overall tracking accuracy (rms tracking error) was calculated. Both the flux-line and the shadowband tracker were found to have an effective rms error of about 1 milliradian. This information was used to determine the impact that the two trackers have on the annual energy performance of typical parabolic trough concentrating collectors. One milliradian rms tracking errors were found to result in negligibly small annual performance losses.

DE82016945 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Dickinson Geothermal Study. Final Report.
G. O. Fossum, K. L. Harris, D. J. Hassett, D. V. Mathsen, and T. C. Owens. Jun 82, 95p EGG-2151
Contract AC07-76ID01570
Best available copy from document source. Available in microfiche only.

The Inyan Kara Formation provides an abundant source of warm (54 to 71 exp 0 C) but salty (7400 mg/l combined Na and Cl ions) water for much of southwestern North Dakota. The city of Dickinson, ND, overlies this aquifer at 1676 to 1768 meters. This study investigates the potential of usng this hydrothermal resource as an energy source for a district heating system in a new undeveloped addition to Dickinson. In addition, the use of a reverse osmosis system to desalinate the water is considered along with other water treatment processes necessary to allow use of this water in the existing city water supply. The results of the study indicate the economic requirements to make this concept feasible and outline the consideration to carry the project into the design phase.

DE82900608 MF **A01**
Council of Technology, Copenhagen (Denmark).
Report on Renewable Energy Sources.
18 Aug 80, 100p NP-2900608
In Danish.Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

Survey is made of the activities in progress on renewable energy and of the financial supports. The shortcomings and problems in connection with the present activities and research are analysed. Some of the obstacles to utilization of renewable energy sources are the absence of coordinating legislation and planning; insufficient technical and economic consumer informations; insufficient public financial supports both for production and for research and development. Suggestions are made of improvements and new initiatives.

All the proposals are not in detail and therefore they should be regarded as a catalogue of ideas. The character of the proposals are related to the following positive effects of utilizing renewable energy sources: employment, exchange balance, security of supply and enviroment. (ERA citation 07:043901)

DE82900610 MF **A01**
Technical Univ. of Denmark, Lyngby. Thermal Insulation Lab.
Calculation of Energy Consumption in Buildings (EFB-1). A Method for Desk Top Calculators.
A. Nielsen. Feb 80, 65p DTH-LV-MEDD-92
In Danish.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

A calculation method for heat consumption in insulated buildings is described. The method is claimed to be simple and yet takes into account free heating and heat accumulation. The program can be run on desk top calculators. It produces maximum and minimum energy consumption values. (ERA citation 07:043979)

DE82900615 PC **A06**/MF **A01**
Renewable Energy, Electric Heating Etc. in Heat Supply Planning. Third Report from the Heat Plan Committee of the Ministry of Energy.
Apr 80, 102p NP-2900615
Portions of this report are illegible.
U.S. Sales Only.

With the only exception of solar and wind energy, many forms of renewable energy are characterized by the common feature that there are physical limitations to their contribution to heat supply. Rough figures have been given as to the extent to which biogas, straw, surplus wood, waste and surplus heat from industry may be included in heat supply. A technical description is given of electric heting systems and plants for the utilization of renewable energy. Furthermore a brief description of incinerator plants, industrial surplus heat and low-temperature systems is given. The heat supply alternatives for those areas of the country which are not expected to be supplied by power plant heat or natural gas are elucidated. First, the number and types of dwellings and the energy consumption for heating in these areas are stated. Next 3 future alternative pictures are presented based on the technicophysical possibilities of heat supply by 1995. The future alternative pictures selected are compared separately to a reference alternative assuming continued individual oil-heating as the main source of supply. Essential economic and social consequences of the future alternative picutres are estimated. (ERA citation 07:054164)

DE82900637 PC **A05**/MF **A01**
Habitation and Heating. Investigation of Development in Housing and Heating Consumption from 1950-1975, and the Possibilities of Energy Conservation in Existing Residential Buildings.
J. Noergaard. Apr 77, 77p DEMO-Project-5
In Danish.Portions of this report are illegible.
U.S. Sales Only. Microfiche only after original copies are exhausted.

An investigation of the development in housing conditions and heating consumption in Denmark (1950-1975) is made. Energy, used for space heating and hot water, has been tripled to about 60 GWh/year. Window area has gone up from 10% to 20% of the floorage. Energy conservation can be accomplished by insulation, automatic temperature regulation and heat recovery. The quantity and rentability of energy conservation is calculated by a dynamic, mathematical model. (ERA citation 07:043955)

DE82900650 MF **A01**
Requirements for Drying of Chips.
G. Gustafsson. Mar 80, 71p NE/BIO-80/13
In Swedish.Portions of this report are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The paper presents experimental results from testing of the equipment for drying of wood in form of chips. The requirements for the amount of heat and the air flow have been investigated. Solar heating has been used and the energy demand for drying has been calculated. Preliminary recommendations for drying of chips in a large scale are presented.. (ERA citation 07:042703)

DE82900678 MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm.
Application of a Method for Aerodynamic Analysis and Design of Horizontal Axis Wind Turbines.
A. Gustafsson, S. Lundgren, and B. Frisk. May 80, 66p FFA-AU-1499, NE/VIND-80-11
Portions of this report are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

This report presents the application of a momentum theory method for static performance analysis and for design of blades for horizontal axis wind turbines. The method is based on a combination of blade element and momentum theory as formulated by wilson and Lissaman. The performance results are presented as power coefficient or shaft power versus windspeed and static blade and turbine loads to be used for structural design. The combination of turbine performance and wind characteristics to obtain annual energy production is also treated. The procedure to obtain the chord and twist distribution that maximizes blade performance at a specified wind speed is described. Numerical results for the Swedish wind power test unit Kalkugnen are presented. (ERA citation 07:043200)

DE82900681 MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm.
Design of a 4.25 M Blade of a Wind Turbine Made of Glass Fiber Laminated Plastics.
L. Knutsson, S. E. Thor, and P. Vestergren. 1980, 52p FFA-HU-2245, NE-VIND-80-10
In Swedish.Portions of this report are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The report deals with the design of the blade of a wind turbine. The blade has the radius of 4.25 m and is made of glass fibre laminated plastics. The weight of the material is ca 15 kg. Stress analysis has been made with the load of 44 m/s wind velocity and an immobile turbine. (ERA citation 07:043202)

DE82900704 MF **A01**
Styrelsen foer Teknisk Utveckling, Stockholm (Sweden).
Saving Energy by Improved Dewatering of Textile Materials.
J. Ohlsson, and H. Aasnes. Nov 80, 19p STU-79-5576
In Swedish.Portions of this report are illegible.
U.S. Sales Only. Available in microfiche only.

The report deals with mechanical dewatering in the Swedish textile industry. An investigation by means of a moisture tester has been made at 8 dyeing and treatment plants. The aim was to improve the dewatering prior to drying and between the rinsing steps to save energy. An improvement on the average by 10 to 15% prior to drying and by 20 to 25% between the rinsing steps seems to be possible when using continuous processes. The discontinuous processes render unsatisfactory dewatering. Theoretically the consumption of water can be reduced by one half when using effective dewatering. (ERA citation 07:044072)

DE82900714 MF **A01**
Uppsala Univ. (Sweden). Meteorologiska Institutionen.
Gotland - Skaane Pibal Project for WECS Siting. Pt. B: Evaluation.
A. S. Smedman. 1980, 27p UUIM-63
Portions of this report are illegible.
U.S. Sales Only. Available in microfiche only.

An attempt is made to analyze the result from the pilot balloon campaigns made during the Gotland-Skaane pilot balloon. A simple statistical model has been used to calculate the climatological differences in wind speed at a height of 100 m at the measuring sites. Some calculations, of the heights where changes in the surface roughness can cause layers with rapidly changing wind shear, have also been performed. (ERA citation 07:043187)

DE82900835 MF **A01**
Technical Univ. of Denmark, Lyngby. Thermal Insulation Lab.
Testing of Solar Collector Efficiency.
S. Svendsen. Nov 80, 291p DTH-LV-MEDD-107
In Danish.Portions of this report are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Detailed specifications of a number of solar collectors are presented. These tests have been carried out at the Thermal Insulation Laboratory from June to August 1980. The tests have been untertaken according to a Danish-Swedish testing method where the test-stand is based on a solar simulator. The present report is dealing with testing of 27 solar collectors in all. A detailed description of each solar collector is given as well as the results of the efficiency tests are mentioned. Furthermore, a comparison of the efficiency of the various solar collectors has been made. The testing which has been made is part of the system evaluation which will have to be made in order to be subsidized by the State as stated in "Law about Stategrants to lasting energy sources". (ERA citation 07:043044)

DE82901072 MF **A01**
Bayerisches Staatsministerium fuer Wirtschaft und Verkehr, Munich (Germany, F.R.).
Energy Programme for Bavaria.
15 Jul 80, 266p NP-2901072
In German.Portions of document are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The Energy programme for Bavaria at hand, approved by the Bavarian State Government on July 15, 1980, explains in detail the energy policy pursued by the Bavarian State Government. The central points of the programme are the following: In view of present and predictable risks, energy supply assurance has to be given priority when fixing the aims of energy policy. In future, coal is also to contribute to a larger extent to energy supplies and to the displacement of oil. In future, energy supplied by means of pipelines has to replace oil to a larger extent in the heat sector. This means: enhanced development of district heat, transfer of gas from power industry into the heat market, increased utilization of electricity for space heating purposes. Indigenous energy sources are to be used to a larger extent, provision for crises is to be improved. But above all the increase in energy consumption has to be reduced further. All useful opportunities of utilizing energy in a more economic and rational manner have to be used, including new energy technologies. (ERA citation 07:043856)

DE82901439 MF **A01**
Styrelsen foer Teknisk Utveckling, Stockholm (Sweden).
Soelvesborg Project. Viewpoints of Energy at Watering with Waste Water.
B. Froeman, and B. Leander. Mar 81, 28p STU-79-3191
In Swedish.Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

A five-year plan of experimental watering of farming soil with biological cleaned community waste water and the resulting gain of energy are presented. The best gain is in the effect of watering which yield 7.2 kWh per m exp 3 with a positive contribution from manuring, making a total of 8.0 kWh per m exp 3 . This means that Soelvesborg can save 3 GWh per year when watering with waste water in the summertime. If 5 % of the waste water which is available in Sweden could be utilized in farming and for the cultivation of trees, the energy gain will be 150 GWh per year. (ERA citation 07:044070)

DE82902069 MF **A01**
Energy Utilization Systems, Inc., Pittsburgh, PA.
1980 Survey and Evaluation of Utility Conservation, Load Management, and Solar End-Use Projects. Volume 1. Conservation Projects. Final Report.
Jan 82, 298p EPRI-EM-2193-V.1
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

A survey of utility-sponsored projects in monitoring the performance of residential and commercial electricity end-use technologies (thermal energy storage, communications, and load control) is presented. The methodology is described. One hundred and thirty energy conservation projects are described and are grouped into five subsections. The subsection categories are: energy conserving devices, systems, and programs; heat recovery devices, systems, and programs; awards and incentives; conservation information, education programs, and displays; and energy conserving rates, rules, and standards. A technical description of each of the devices and techniques is presented. A discussion of general program impacts and costs, a

report on general utility feedback as to the effectiveness of the programs; and, if applicable, a listing of manufacturers whose equipment was used in the various projects are included. (ERA citation 07:043920)

DE82902075 MF **A01**
Washington Univ., St. Louis, MO. Dept. of Systems Science and Mathematics.
Parallel Multiarea State Estimation. Final Report.
H. Mukai. Jan 82, 65p EPRI-EL-2218
Portions of document are illegible.
Available in microfiche only.

In this project new methods are developed to significantly speed up the computational process of power-system static state estimation and of the accompanying detection-identification. For this purpose, a power system is geographically and/or electrically decomposed into several subsystems. Raw measurements made within each subsystem are transmitted to its local center. Then, under the direction of the central computer at the control center of the entire system, local computers at local centers, operating simultaneously in a satellite configuration, process their local measurements and compute estimates for states in their respective portions of the system. Approximate Newton's methods are developed for minimizing the weighted estimation error. For the purpose of reducing computation time, the methods are designed to exploit parallel operation of local computers and to take advantage of the random sparse structure found in power network equations by employing sparse matrix techniques in parallel. Furthermore, they are designed to keep data transmission between computers to a minimum. These methods, if implemented, are expected to lead to major improvements in the response time, system size manageability and reliability of state estimation. They will significantly shorten the time interval between telemeasurement and report of state estimate (as compared with the conventional centralized single-area approach). They will allow the estimator to monitor large power systems without excessive degradation in response time. They will make it possible to estimate most of the states in the entire system even when malfunctions occur in small isolated areas. (ERA citation 07:043290)

DE82902154 MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Efficiency of Flat Plate Solar Collectors.
H. Boeck, R. Hallermayer, W. Schoelkopf, and A. Wiesmeth. Dec 80, 62p BMFT-FB-T-80-194
In German.Portions of this report are illegible.
U.S. Sales Only. Available in microfiche only.

The thermal efficiency of flat plate solar collectors can - from a physical point of view - be improved in various aspects. 1) The enhancement of absorption of solar radiation and the reduction of emissivity of thermal radiation. Methods are checked for measuring the spectral resolution of absorptivity and the evaluation of an overall absorptivity with a solar spectrum. With a calorimetric device the hemispherical thermal emissivity of various specimens can be measured. Such methods are fundamental in particular for the development of selective coatings. 2) The convective heat transfer between cover and absorber of a flat plate collector can be at least partially suppressed by various inserted structures. Details of experimental results are presented. 3) The optical transmission of the cover of flat plate collectors can be improved by interference layers as is shown in a model calculation. Such an improvement is important in cases, where a correct azimuthal orientation of the collector is impossible. Finally, results of an experimental comparative test of several commercial flat plate collectors are reported. These collectors can be classified on the basis of aptitude for swimming pool, hot water and support of house heating. (ERA citation 07:043030)

DE82902514 MF **A01**
New Jersey Dept. of Energy, Newark.
Electric Utility Forecasting in New Jersey.
B. C. Patel, V. Bozzo, and A. J. Polomski. May 81, 93p NP-2902514
Portions of document are illegible.
Available in microfiche only.

This report, prepared in response to the growing concerns over the forecasts of electrical consumption and peak demand requirements upon which generating capacity plans are made by the three New Jersey electric utilities, contains a compilation of the latest forecasting techniques being used by New Jersey utilities, including modeling concepts and the demographic, technological, and economic factors which influence the development of the annual forecasts for the three major New Jersey utility companies: Atlantic City Electric (ACE), Jersey Central Power and Light (JCP and L), and Public Service Electric and Gas. (ERA citation 07:047125)

DE82903489 MF **A01**
Department of Energy, London (England).
Energy Projections 1979.
1979, 20p NP-2903489
Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

This paper presents the main features of the Department's latest round of energy projections concentrating on the period to 2000. The projections examine possible levels of energy demand, based on alternative assumptions about economic growth and incorporating allowances for energy conservation, and they explore ways in which those demands might be met by the various fuels, having regard to relative cost and availability. The forecasting methodology generally follows that described in Energy Paper No. 29, the demand for energy being estimated on a fuel by fuel basis in each of five main sectors of the economy: Domestic, Iron and Steel, Other Industry, Transport and Other Consumers whose main components are the private and public service sectors and which also include agriculture. (ERA citation 07:042305)

DE82904052 MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Advanced Systems Technology Div.
Phase II: Frequency Domain Analysis of Low-Frequency Oscillations in Large Electric Power Systems. Volume 5. Studies of a Large System. Final Report.
R. T. Byerly, D. E. Sherman, and R. J. Bennon. Apr 82, 109p EPRI-EL-2348-V.5
Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

This report describes eigenvalue calculations for a large electric power system using the computer program AESOPS. This work was undertaken to provide program testing and acquire experience in program application to large systems. Data is supplied by the Electric Power Research Institute. Study results include descriptions of six modes of oscillation which involve numerous generators. Considerable emphasis is given to study procedures, including methods of deriving equivalent system models of reduced dimensions. The effects of power system stabilizers on damping is calculated for each of the six modes studied in detail.

N82-31770/2 PC **A05**/MF **A01**
Computer Sciences Corp., Hampton, VA.
Necap - NASA's Energy Cost Analysis Program. Operations Manual.
Final Report.
D. L. Miner. Jun 82, 85p NAS 1.26:165802, NASA-CR-165802
Contract NAS1-16078

The use of the NASA'S ENERGY COST ANALYSIS PROGRAM (NECAP) is described. Supplementary information on new capabilities and program options is also provided. The Control Data Corporation (CDC) NETWORK OPERATING SYSTEM (NOS) is discussed. The basic CDC NOS instructions which are required to successfully operate NECAP are provided.

N82-31820/5 PC **A05**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Abt. Reaktorsicherheit und Umwelt.
Calculation of the Final Energy Demand for the Federal Republic of Germany with the Simulation Model Medee-2 die Bestimmung des Energiebedarfs der Bundesrepublik Deutschland MIT Hilfe des Simulationsmodells Medee-2.
U. Loeffler, and H. Weible. Aug 81, 82p IKE-K-66, ISSN-0173-6892
In German; English Summary.

The final energy demand for the Federal Republic of Germany was calculated. The model MEDEE-2 describes, in relationship to a given distribution of the production of single industrial sectors, of energy specific values and of population development, the final energy consumption of the domestic, service industry and transportation sectors for a given region. The input data, consisting of constants and variables, and the proceeding, by which the projections for the input data of single sectors are performed, are discussed. The results of the calculations are presented and are compared. The sensitivity of single results in relation to the variation of input values is analyzed.

PAT-APPL-6-383 063 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Vertical Shaft Windmill.
Patent Application,
D. C. Grana, and S. V. Inge, Jr. Filed 28 May 82, 8p N82-29713/6, NASA-CASE-LAR-12923-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A vertical shaft windmill that automatically controls its maximum rotational speed in high winds is disclosed. Several equally spaced blades are mounted on the vertical shaft. Each blade consists of an inboard section attached to the shaft and an outboard section skew hinged to the inboard section. The outboard sections automatically adjust their positions with respect to the fixed inboard sections with changes in velocity of the relative wind. When the wind reaches a certain velocity the inboard sections and the outboard sections form flat surfaces. Hence, any further increase in the wind velocity will not increase the rotational speed of the shaft. With the outboard sections in downward positions any abrupt changes in wind will move most of the outboard sections upward releasing part of the load and protecting the windmill.

PB83-852335 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solar Energy Bibliographies. 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Oct 82.
Oct 82, 135p
Supersedes PB82-857434.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning bibliographies of various sources and aspects of solar energy information which have been compiled by government, educational, and private organizations. Some of the bibliographies consider comparative materials evaluations. (This updated bibliography contains 140 citations, 31 of which are new entries to the previous edition.)

10B. Power Sources

AD-A119 455/4 PC **A03**/MF **A01**
Area Therm Corp., Springfield, VA.
Thermal Suppression of Exhaust Pipes.
Final rept. Feb-Aug 82,
Edward F. Allard. Sep 82, 38p Rept no. ATC-55
Contract DAAK70-82-C-0040

Under the above contract, we were successful in thermally suppressing the hot exhaust gas on a 3 kW engine-generator set. This realistic experiment cooled the engine's exhaust gas from around 400 degrees C down to around 55 degrees C. (Author)

AD-A119 538/7 Not available NTIS
Weapons Systems Research Lab., Adelaide (Australia).
The Darrieus Wind Turbine for Electrical Power Generation,
M. L. Robinson. 1981, 19p Rept no. WSRL-0255-EX
Availability: Pub. in Aeronautical Jnl. of the Royal Aeronautical Society, p244-255 Jun 81 (No copies furnished by DTIC/NTIS).

No abstract available.

DE82005393 MF **A01**
FMC Corp., Santa Clara, CA. Engineered Systems Div.

Solar-Thermal Central-Receiver Research Study. Interim Report.
Feb 77, 160p DOE/ET/20426-T6
Contract AC03-76ET20426
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A performance analysis and economic study has been completed of a cavity-type line central receiver and single-axis parabolic cylinder focusing heliostat array for generation of steam for electrical power. A solar thermal power plant was sized to produce 100 MWe at 2:00 p.m. of winter solstice. The system concept is presented. Using the cavity once-through receiver with boiler tubes having an absorptivity of 0.9 and an emissivity of 0.7, it was calculated that total busbar cost in 1976 dollars during the year 1991 the second year at operation, will be 30.27 mills per kilowatt hour. The estimated total capital investment for the 100-MWe plant for the first year of commercial operation is $1908 per kilowatt of capacity. (ERA citation 07:042908)

DE82007758 PC **A03**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Advanced Energy Systems Div.
Cell-Module and Fuel-Conditioner Development. 8TH Quarterly Report, July-September 1981.
J. M. Feret. Oct 81, 32p DOE/NASA/0161-9A, NASA-CR-165462-A
Contract AI01-80ET17088
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Microfiche only after original copies are exhausted.

The efforts performed to develop a phosphoric acid fuel cell (PAFC) stack design having a 10 kW power rating for operation at higher than atmospheric pressure based on the existing Mark II design configuration is described. The initial work as reported herein involves: (1) performance of pertinent functional analysis, trade studies and thermodynamic cycle analysis for requirements definition and system operating parameter selection purposes, (2) characterization of fuel cell materials and components, and performance testing and evaluation of the repeating electrode components, (3) establishment of the state-of-the-art manufacturing technology for all fuel cell components at Westinghouse and the fabrication of short stacks of various sites, and (4) development of a 10 kW PAFC stack design for higher pressure operation utilizing the top down systems engineering approach. (ERA citation 07:043915)

DE82008041 PC **A03**/MF **A01**
Gas-Cooled Reactor Associates, La Jolla, CA.
High-Temperature Gas-Cooled Reactor Steam Cycle/Cogeneration Application Study Update.
Sep 81, 38p DOE/SF/02034-T49
Contract AC03-78SF02034

Since publication of a report on the application of a High Temperature Gas-Cooled Reactor Steam Cycle/Cogeneration (HTGR-SC/C) plant in December of 1980, progress has continued on application related activities. In particular, a reference plant and an application identification effort has been performed, a variable cogeneration cycle balance-of-plant design was developed and an updated economic analysis was prepared. A reference HTGR-SC/C plant size of 2240 MW(t) was selected, primarily on the basis of 2240 MW(t) being in the mid-range of anticipated application needs and the availability of the design data from the 2240 MW(t) Steam Cycle/Electric generation plant design. A variable cogeneration cycle plant design was developed having the capability of operating at a range of process steam loads between the reference design load (full cogeneration) and the no process steam load condition (all electric generation).

DE82008090 PC **A03**/MF **A01**
Argonne National Lab., IL.
OTEC-1 Power System Test Program: Performance of One-Megawatt Heat Exchangers.
J. J. Lorenz, D. Yung, P. A. Howard, C. B. Panchal, and F. W. Poucher. Nov 81, 35p ANL/OTEC-PS-10
Contract W-31-109-ENG-38
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Heat exchanger test results for the first deployment of OTEC-1 are reported. These tests were aimed at evaluating the performance of a state-of-the-art, 1-MWe titanium shell-and-tube evaporator and condenser in an ocean environment. The evaporator consisted of both a plain and an enhanced (Union Carbide High Flux) tube bundle, whereas the condenser had plain tubes only. All tests with the evaporator were conducted in the sprayed-bundle mode. Experimental results for the condenser and plain-tube portion of the evaporator were in excellent agreement with performance predictions. This result demonstrates that the thermal performance of large plain-tube heat exchangers can be predicted with a high level of confidence. However, the performance of the enhanced-tube portion of the evaporator was much lower thn predicted. Evidence strongly suggested that this poor performance was attributable mainly to fouling of the High Flux surface by corrosion products consisting predominantly of hydrated aluminum oxides. (ERA citation 07:049788)

DE82008265 PC **A02**/MF **A01**
Gas-Cooled Reactor Associates, La Jolla, CA.
HTGR-Steam Cycle/Cogeneration Plant Economic Potential.
May 81, 23p DOE/SF/02034-T62
Contract AC03-78SF02034

The cogeneration of heat and electricity provides the potential for improved fuel utilization and corresponding reductions in energy costs. In the evaluation of the cogeneration plant product costs, it is advantageous to develop joint-product cost curves for alternative cogeneration plant models. The advantages and incentives for cogeneration are then presented in a form most useful to evaluate the various energy options. The HTGR-Steam Cycle/Cogeneration (SC/C) system is envisioned to have strong cogeneration potential due to its high-quality steam capability, its perceived nuclear siting advantages, and its projected cost advantages relative to coal. The economic information presented is based upon capital costs developed during 1980 and the economic assumptions identified herein.

DE82008276 MF **A01**
Gas-Cooled Reactor Associates, La Jolla, CA.
Current Experience with Central-Station Nuclear Cogeneration Plants.
Oct 81, 61p DOE/SF/02034-T60
Contract AC03-78SF02034
Portions of document are illegible.
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In considering the potential of the HTGR for nuclear cogeneration, a logical element for investigation is the recent history of nuclear cogeneration experience. Little is found in recent literature; however, the twin nuclear cogeneration plant at Midland is nearing completion and this milestone will no doubt be the basis for a number of reports on the unique cogeneration facility and operating experiences with it. Less well known in the US is the Bruce Nuclear Power Development in Ontario, Canada. Originally designed to cogenerate steam for heavy water production, the Bruce facility is the focus of a major initiative to create an energy park on the shores of Lake Huron. To obtain an improved understanding of the status and implications of current nuclear cogeneration experience, GCRA representatives visited the Ontario Hydro offices in Toronto and subsequently toured the Midland site near Midland, Michigan. The primary purpose of this report is to summarize the results of those visits and to develop a series of conclusions regarding the implications for HTGR cogeneration concepts.

DE82008277 PC **A02**/MF **A01**
Gas-Cooled Reactor Associates, La Jolla, CA.
Overview of the Siting Characteristic of the HTGR Steam Cycle/Cogeneration.
Nov 81, 23p DOE/SF/02034-T63
Contract AC03-78SF02034

This report presents an overview of the siting characteristics of the HTGR-SC/C design and compares them to current NRC limiting criteria for radiological impact considerations. A system advantage comparison is also made to an equivalent size PWR. Data are presented in summary tabular format that is derived from existing plant designs and published safety and environmental analysis for both the HTGR and the PWR.

DE82008540 PC **A02**/MF **A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.
Hazard-Identification Matrix for 10-MW/sub E/ Solar-Thermal Central-Receiver Pilot Plant: Preliminary Hazard-Analysis Input.
H. R. Wander. 22 Nov 78, 17p DOE/ET/21007-T7
Contract AC03-79ET21007

The hazard matrix is our gross identifier of potential solar collector subsystem hazards. The matrix will be used as a hazard reference in the accomplishment of the preliminary design hazard analysis, and to assist system design engineers in the evaluation of the specific subsystem design.

DE82008559 MF **A01**
California State Government, Sacramento.
Second Phase Report on Identification of Environmental Issues Hybrid Wood-Geothermal Power Plant. Wendel-Amedee KGRA, Lassen County, California.
14 Aug 81, 64p DOE/ET/27244-T4-V.2
Contract FG03-79ET27244
Portions of document are illegible.
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The permitting process is reviewed. The environmental data requirements are presented for: air resources; vegetation and wildlife; geotechnical environment; surface waters; cultural resources; public health, industrial hygiene, and noise; land use and socio-economic factors; and scheduling and budgets. (ERA citation 07:046470)

DE82008621 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Intermediate Photovoltaic System Application Experiment Operational Performance Report. Volume 7, for Newman Power Station, El Paso, TX.
Jan 82, 22p SAND-81-70867
Contract AC04-76DP00789

Performance data are given for the month of December, 1981 for a photovoltaic power supply at a Texas power station. Data include: monthly and daily electric energy produced; monthly and daily solar energy received; monthly and daily array efficiency; plots of energy produced as a function of power level, voltage, cell temperature, and hour of the day; monthly and daily electrical energy supplied by the photovoltaic system to the load; daily system availability; monthly and hourly insolation; monthly and hourly ambient temperature; monthly and hourly wind speed; wind direction distribution; heating and cooling degree days; number of freeze/thaw cycles; hourly cell temperature; and a plot of daily data acquisition mode and recording interval. Also included are brief summaries of three site events. (ERA citation 07:053377)

DE82008760 MF **A01**
Solar Energy Research Inst., Golden, CO.
Cadmium Sulfide-Copper Sulfide Heterojunction Cell Research. Quarterly Report, June 1-August 31, 1981.
R. W. Birkmire, R. B. Hall, and J. E. Phillips. Feb 82, 55p SERI/PR-8309-1-T7
Contract AC02-77CH00178
Best available copy from document source. Available in microfiche only.

The localization and elimination of shunting defects in Cu sub 2 S/CdS cells is reported. Cells free of such defects are shown to be voltage stable under prolonged exposure at open-circuit voltage. An attempt to eliminate shunting defects by interposing an insulating layer between the CdS and the ohmic back contact is reported. Further development of an alternate cell design utilizing a transparent substrate is reported and practical difficulties in producing such cells are described. Production of large grain CdS substrates for use in detailed studies of the Cu sub 2 S layer has been only partially successful. Zinc contents in Cd/sub 1-x/Zn/sub x/S higher than about 20% are necessary in order to further improve the open-circuit voltage and conversion efficiency of Cu sub 2 S based cells. Growth results for such films utilizing both compound sources and a three element source system are described. The three element source system has now been calibrated for both zinc and cadmium. Inhomogeneities in Cd/sub 1-x/Zn/sub x/S silms produced from various compound source designs are discussed.

DE82008978 MF **A01**
Utah Univ., Salt Lake City.

Utah Energy-Facility-Siting Study. Phase I: Great Basin.
Nov 80, 365p DOE/SF/01484-T7
Contract AM03-77SF01484
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

A detailed study was made of methods for predicting the electric power demand in the Great Basin Area of Utah, of the sites available for constructing coal-fired power plants to meet this demand, and of the environmental and socio-economic impacts of building these plants within existing legal and regulatory constraints. Information is included on the availability of sites; coal and water supplies; the modeling of environmental and socio-economic impacts; site selection methodologies; economic feasibility studies; the regulatory processes; and alternative technologies. (ERA citation 07:046608)

DE82008979 MF **A01**
Utah Univ., Salt Lake City.
Utah Energy-Facility-Siting Study. Phase II: Colorado Plateau.
Nov 81, 442p DOE/SF/01484-T8
Contract AM03-77SF01484
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The general purposes of the Great Basin Study were: to understand the balance between social/economic/resource/environmental interests in the study areas; to facilitate the siting of energy facilities in the study areas; and to reduce planning/construction lead time through limited pre-evaluation of siting zones. Although the emphasis of this study is on the supply side of the electricity production-transmission-distribution market, the study is based on understanding the needs of the West for new electric generating capacity. The end products of the Colorado Plateau Study are: an inventory of pre-evaluated general zones for energy facility siting with definition of the general limits of that pre-evaluation; an analysis of the tradeoffs of locating coal-fired steam electric plants and/or synthetic fuel developments in the general zones of siting feasibility; an analysis and forecast of the demographic and economic impacts of given levels of energy development on the Plateau; an examination of the sociocultural impacts of energy development with recommendations for mitigation strategies, and a description of the current institutional framework for financing impact mitigation measures; a report on the competitive position of Utah coals in the power generation market in the western US, with consideration of a potential Far East export market; a review of water supply conditions on the Plateau with attention to the issues of both water quantity and quality; and an analysis of the legal and regulatory process for siting and constructing energy facilities with consideration of strategies for coordinating and expediting project decisions. Each of these items is discussed. (ERA citation 07:046609)

DE82008987 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Technical Evaluation of the Adequacy of Station Electric-Distribution-System Voltages for the Arkansas Nuclear One, Unit 2.
J. C. Selan. 10 Mar 82, 12p UCID-19127
Contract W-7405-ENG-48

This report documents the technical evaluation of the adequacy of the station electric distribution system voltages for the Arkansas Nuclear One, Unit 2. The evaluation is to determine if the onsite distribution system in conjunction with the offsite power sources has sufficient capacity to automatically start and operate all Class 1E loads within the equipment voltage ratings under certain conditions established by the Nuclear Regulatory Commission. The analyses submitted demonstrate that the station's electric distribution system supplies adequate voltage to the Class 1E equipment under the worst case conditions analyzed. (ERA citation 07:053745)

DE82009024 MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
10-MWe Solar-Thermal Central-Receiver Pilot Plant Solar Facilities Design Integration: Plant Maintenance/Training Manual (RADL Item 2-37). Section 2. Stationary Apparatus.
Jul 81, 400p SAN-0499-82-Sec.2, MDC-G-9705-Sect.2
Contract AC03-79SF10499
Portions of document are illegible.
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The stationary apparatus for the Barstow Solar Pilot Plant are listed, including: heat exchangers, receiver panels, tanks, vessels, and receivers, deaerator, condenser to the turbine-generator, desuperheaters, filters and strainers, demineralizers, heaters, dryers, separators, ullage gas supply and conditioning, auxiliary boilers, sewage treatment plant, expansion joints, and orifice plates. Specifications, operation and maintenance instructions are given for the heat exchangers, receiver panels, filters and strainers, separators, and especially for the ullage gas supply and conditioning. (ERA citation 07:042917)

DE82009039 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Preliminary Investigaton of Electromagnetic Pulse Effects on Commercial Nuclear Power Plant Systems.
D. M. Ericson, Jr., D. F. Strawe, S. J. Sandberg, V. K. Jones, and G. D. Rensner. 1982, 4p SAND-82-0660C, CONF-820708-1
Contract AC04-76DP00789
IEEE annual conference on nuclear and space radiation effect, Las Vegas, NV, USA, 20 Jul 1982.

The study arrived at the following preliminary conclusions: Diffusion fields inside Seismic Class I buildings are negligible. EMP signal entry points are identifiable. Signal attenuation and distribution can be reasonably modeled. Damage thresholds are substantial for the components (C. 1970) examined. Predicted EMP signals at the critical equipment are less than, or equal to, nominal operating levels. The selected safe shutdown systems examined will not be damaged by EMP.

DE82009131 MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Salton Sea Project: Phase 1. Final Report.
M. L. Peelgren. 15 Jan 82, 133p DOE/JPL-1060-54, JPL-PUB-81-108
Contract AI01-76ET20307
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

A feasibility study was made for a salt gradient solar pond power plant in or near the Salton Sea of California. The conclusions are very supportive of continuing the project into the next phase; design and construction of a 5-MWe proof-of-concept experiment, and ultimate construction by an electric utility company of a 600-MWe plant. The Solar Pond concept will provide an environmental benefit to the Salton Sea by reversing the increasing salinity trend that, if unchecked, will eventually kill all life in the sea. The greatest cost drivers determined for the 5-MWe plant are the lake dike construction and pond sealing. Problems remaining to be resolved include method of brine production from Salton Sea water for the first unit (which will require evaporation pond area and time), the high turbidity and color content of the Salton Sea water (which will require pre-treatment), and other questions related to pond permeability, bio-activity and soil/brine chemical reactions. All technical and environmental problems appear solvable and/or manageable if care is taken in mitigating impacts. (ERA citation 07:046403)

DE82009167 MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
Plant Maintenance/Training Manual (RADL Item 2-37). Section 6: Control and Data Systems, Book 1 of 2. 10-MWe Solar-Thermal Central-Receiver Pilot Plant. Solar-Facilities Design Integration.
Jul 81, 333p SAN-0499-82-Sec.6-Bk.1, MDC-G-9705-Sect.6-Bk.1
Contract AC03-79SF10499
Portions of document are illegible.
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The control and data systems include the control console, the subsystem distributed process control, interlock logic system, and signal conditioning unit. The components of all these systems are listed, and the signal conditioning units are individually described and specified with operating instructions given. (ERA citation 07:042928)

DE82009170 MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
Operating Control System: Data-Acquisition System Preoperational Test Procedure 340: 10 MWe Solar Pilot Plant, Daggett, California.
J. C. Kruh. 1981, 226p DOE/SF/10499-T66
Contract AC03-79SF10499
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Preoperational tests for the operating control system (OCS) and data acquisition system (DAS) of the Barstow Solar Pilot Plant are described which are to meet the objectives of: powering up the OCS and DAS main equipment cabinets and demonstrating power on operation; powering up DAS and OCS peripherals and preparing for operational usage; performance of OCS system diagnostics test and verification that the system is ready for functional operation; performance of DAS system diagnostics tests and verification that the system is ready for functional operation; and demonstration that the MAXNET operating system is functional in the OCS computer. Acceptance criteria, prerequisites, initial conditions, test equipment, and test and data collection procedures are listed, and limits and precautions are given. (ERA citation 07:046320)

DE82009298 PC **A05**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Impact of Alternative Small-Wind Systems Standards-Development Scenarios. Volume II. Technical Report.
R. Silberglitt, K. Boone, B. Greer, H. L. Hamester, and K. Robertson. Jan 81, 94p RFP-3273/2-V.2
Contract AC04-76DP03533
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The potential impacts of a number of alternative scenarios for the development of standards for small wind energy conversion systems (SWECS) were analyzed. Because of the embryonic state of the SWECS industry, standards can play a particularly important role in affecting the course of SWECS commercialization. Past experience indicates that in order to be effective, such standards should be developed as the result of a consensus process, assimilating input from all concerned parties. The current status of efforts to develop voluntary consensus standards for SWECS is examined and the opinions of various affected groups and individuals with regard to SWECS standards are assessed. A methodology is presented for determining the impacts of six different types of SWECS standards written by four separate groups, or actors. As the result of this impact assessment, and the assigning of weights to the impacts of each standard, an optimum scenario is presented. The optimum scenario represents an effort to maximize the contribution of each actor in order to produce broad-based consensus standards. Finally, an implementation plan is suggested for the optimum scenario. (ERA citation 07:043189)

DE82010926 MF **A01**
Solar Energy Research Inst., Golden, CO.
Electric-Utility Value Determination for Wind Energy. Volume II. A User's Guide.
D. Percival, and J. Harper. Jan 82, 121p SERI/TR-732-604R-V.2
Contract AC02-77CH00178
Portions of document are illegible.
Available in microfiche only.

A method is described for determining the value of wind energy systems to electric utilities. It is performed by a package of computer models available from SERI that can be used with most utility planning models. The final output of these models gives a financial value ($/kW) of the wind energy system under consideration in the specific utility system. (ERA citation 07:043191)

DE82011141 PC **A04**/MF **A01**
Optical Coating Lab., Inc., City of Industry, CA. Photoelectronics Div.

Silicon Solar-Cell Process: Development, Fabrication, and Analysis. Tenth Quarterly Report, 1 July 1981-30 September 1981.
H. I. Yoo, P. A. Iles, and D. C. Leung. 1981, 61p
DOE/JPL/955089-81/13
Contract NAS-7-100-955089
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Work has progressed in fabrication and characterization of solar cells from UCP wafers and LASS ribbons. Gettering tests applied to UCP wafers made little change on their performance compared with corresponding baseline data. Advanced processes such as SJ, BSF, and MLAR were also applied. While BSF by Al paste had shunting problems, cells with SJ and BSF by evaporated Al, and MLAR did achieve 14.1% AM1 on UCP silicon. The study of LASS material was very preliminary. Only a few cells with SJ, BSR, (no BSF) and MLAR were completed due to mechanical yield problems after lapping the material. Average efficiency was 10.7% AM1 with 13.4% AM1 for CZ controls. Relatively high minority carrier diffusion lengths were obtained. The lower than expected Jsc could be partially explained by low active area due to irregular sizes. (ERA citation 07:042792)

DE82012061 PC **A13**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Second-Generation Photovoltaic Two-Axis Tracking Structure Development Program.
Feb 82, 290p SAND-81-7184
Contract AC04-76DP00789
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Design of a two axis turntable tracking structure supporting 336 photovoltaic concentrator modules producing 35 kW has been completed. The tracking structure rotates about a central pinthe supported by 20 post-mounted wheels to follow the sun in azimuth. A simple actuator tilts modules supported on 7 rows of torque tubes to follow the sun in elevation. Design optimization trade studies are summarized and truss structure and foundations. Complete design drawings are also included. (ERA citation 07:053376)

DE82012391 MF **A01**
Mathtech, Inc., Princeton, NJ.
Coal-Using Integrated Community Energy Systems: Volume V. Process Models. Final Report.
Apr 78, 206p DOE/AD/11209-T7-V.5
Contract AC01-81AD11209
Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

A coal using integrated energy system is generally comprised of a series of unit processes related to one another in a manner necessary to satisfy the energy demands of a given community. A unit process, here, is defined as an operation to either convert energy from one form to another, transfer energy from one media to another, transport energy from one location to another, or to store the energy. These unit processes are in a way the building blocks for every energy conversion/distribution system. Modeling a diverse system such as CU-ICES, in a form amenable to mathematical optimization requires disaggregation of the system into its elements, characterization of the elements, and reintegration of the elements back into the system. This document contains characterization of the unit processes for the CU-ICES program. For each process the following descriptions are provided: (1) input-output relationships for the process; (2) other process constraints such as emission standards; and (3) cost functions. The input-output equations describe the quantity and type of fuels input as a function of primary product output. Other energy products and by-products of the process are also described in terms of the primary output. The range of primary output itself is defined by the rated capacity of the unit process and its minimum operating level. (ERA citation 07:044085)

DE82012392 MF **A01**
Mathtech, Inc., Princeton, NJ.
Coal-Using Integrated Community Energy Systems: Volume VI. Starrett City Case Study. Final Report.
Apr 78, 117p DOE/AD/11209-T7-V.6
Contract AC01-81AD11209
Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

The purpose of this paper is to report on the initial test results of the CU-ICES optimization model. These tests were carried out using actual demand data from the Starrett City housing complex, Brooklyn, New York. In Section 2, the Starrett City central plant energy system is described while in Section 3, the demand data and the aggregation method used to aggregate the data are discussed. In Section 4, a rationale for testing and a list of the tests performed are given. Section 5 contains a detailed discussion of each test performed, the result of each test and conclusions. Appendix 1 contains the details of the Starrett City central plant energy system, while Appendix 2 the details of the mathematical model used. (ERA citation 07:044086)

DE82012393 MF **A01**
Mathtech, Inc., Princeton, NJ.
Coal-Using Integrated Community Energy Systems: Volume VII. The ADAM Program. A Demand Aggregation Model, Program Description and User's Manual. Final Report.
Apr 78, 73p DOE/AD/11209-T7-V.7
Contract AC01-81AD11209
Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

This report describes a computer model developed by MATHTECH that provides a method for optimal aggregation of time series data. The model was developed specifically for aggregating energy demand data but the model is capable of aggregating any time series with the property that the underlying time domain corresponds to the Julian calendar; that is, time points can be considered to be the 24 hours of a day, seven days belong to a week, and 52 weeks make up a year. The ADAM model provides a method of determining daly demand profiles that accurately represent a yearly demand pattern. In addition, the model provides the fraction of the year for which each demand profile is applicable. This allows the user to weight the demand profiles according to their yearly frequency of occurrence. (ERA citation 07:044087)

DE82012404 MF **A01**
Mathtech, Inc., Princeton, NJ.
Coal-Using Integrated Community Energy Systems: Volume II. Users' Guide. Final Report.
Apr 78, 192p DOE/AD/11209-T7-V.2
Contract AC01-81AD11209
Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

This guide contains information on the OASIS II computer system. It has been developed to aid in the design process for community energy systems. Discussion is presented under the following headings: capabilities and uses of the model; model description; problem definition guide; optimization guide; and process library guide. (ERA citation 07:044082)

DE82012582 PC **A07**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Hydroelectric Plant Construction Cost and Annual Production Expenses - 1979.
Mar 82, 147p DOE/EIA-0171-79
Microfiche only after original copies are exhausted.

Using a cross-section of plants located in the US and Puerto Rico, this publication is designed to show the investment cost of hydroelectric plants and the cost (exclusive of annual fixed costs) to electric utilities to produce hydroelectric power. At year-end 1979, there were 1145 hydroelectric plants owned and operated by electric utilities, including federal and state agencies, in the US. This report presents detailed data for 1979 for 470 selected major hydroelectric plants. Of these 470 plants, 464 are in the contiguous US, 3 are in Alaska, and 3 are in Puerto Rico. Net generation of plants as indicated in this publication total 261.5 billion kWh. This aggregate net generation is 93.4% of the net generation by hydroelectric plants in the US in calendar year 1979. The plants for which data are included in this publication are a cross-section of large (10 MW and greater) hydroelectric projects of several classes of ownership, including private, municipal, public power district, and federal. Of the included plants, 344 are non-federal. The publication contains data on installed generating capacity, net generation, net capability, cost of plant, production expenses, and hydraulic features for all such plants. The publication is composed of detailed tabular data for each plant. The table is arranged alphabetically by state, utility (operating company), and plant. Data for plants located in Puerto Rico appear last. (ERA citation 07:043871)

DE82012695 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Economic and Financial Analysis of Residential Photovoltaics Systems: The Impact of Solar Photovoltaics on Utilities. Final Report.
M. T. Katzman, and A. C. Katzman. Feb 82, 32p
DOE/ET/20279-185
Contract AC02-76ET20279

Hourly load data from El Paso Electric and Boston Edison are subjected to preliminary examination by comparison with simulated photovoltaic array output. Three utility production costing and reliability models are compared: SYSGEN, SIMSTOR, and GENCOST. All simulations suggest that photovoltaic penetration will: (1) result in economically significant fuel savings; (2) result in small reductions in capacity requirements; and (3) result in total savings that are likely to exceed the costs of photovoltaic systems by the late 1980s. The value of savings per MW of photovoltaics diminishes with increased penetration. (ERA citation 07:046266)

DE82012938 MF **A01**
Princeton Univ., NJ. Dept. of Mechanical and Aerospace Engineering.
Plasmadynamics and Ionization Kinetics of Thermionic Energy Conversion.
J. L. Lawless, Jr., and S. H. Lam. Feb 82, 198p
DOE/ET/15352-T1, COO-2533-13
Contract AC02-76ET15352
Portions of document are illegible.
Available in microfiche only.

To reduce the plasma arc-drop, thermionic energy conversion is studied with both analytical and numerical tools. Simplifications are made in both the plasmadynamic and ionization-recombination theories. These are applied to a scheme proposed presently using laser irradiation to enhance the ionization kinetics of the thermionic plasma and thereby reduce the arc-drop. It is also predicted that it is possible to generate the required laser light from a thermionic-type cesium plasma. The analysis takes advantage of theoretical simplifications derived for the ionization-recombination kinetics. It is shown that large laser ionization enhancements can occur and that collisional cesium recombination lasing is expected. To complement the kinetic theory, a numerical method is developed to solve the thermionic plasma dynamics. To combine the analysis of ionization-recombination kinetics with the plasma dynamics of thermionic conversion, a finite difference computer program is constructed. It is capable of solving for both unsteady and steady thermionic converter behavior including possible laser ionization enhancement or atomic recombination lasing. A proposal to improve thermionic converter performance using laser radiation is considered. In this proposed scheme, laser radiation impinging on a thermionic plasma enhances the ionization process thereby raising the plasma density and reducing the plasma arc-drop. A source for such radiation may possibly be a cesium recombination laser operating in a different thermionic converter. The possibility of this being an energy efficient process is discussed. (ERA citation 07:043909)

DE82013336 MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Proceedings of the 19TH Project Integration Meeting. Progress Report 19, July-November 1981.
1982, 391p DOE/JPL-1012-67, CONF-811192-Sum.
Contract AI01-76ET20356
19. project integration meeting, Pasadena, CA, USA, 11 Nov 1981, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Separate abstracts were prepared for the progress report and the proceedings.

DE82013484 MF **A01**
Mid-American Solar Energy Complex, Minneapolis, MN.

Evaluating the Potential for Small Wind-Driven Electric Generation as an Integral Part of the Wisconsin-Upper Michigan System.
R. Timm. May 80, 199p MASEC-SCR-80-012
Contract AC02-79CS30150
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The economic analysis of small wind energy conversion systems (SWECS) integrated into an existing electric generating system requires a detailed simulation of the particular system. This study analyzes the comparative economic benefits of SWECS with conventional generating sources for the Wisconsin-Upper Michigan System (WUMS). In addition to examining SWECS in the WUMS system, direct load management (DLM) is analyzed in combination with SWECS. The analysis is also extended to include uncertainty costs; i.e. those costs which are associated with errors in forecasting over extended periods of time and errors in the costs and operating characteristics of planned generation facilities.

DE82013497 MF **A01**
Mid-American Solar Energy Complex, Minneapolis, MN.
Case Study Evaluating the Potential for Small Wind Energy Conversion Systems (SWECS) As an Integral Part of the Generating Mix for a Regional Utility - the Kansas Gas and Electric Company. Final Report.
M. T. Jong, and G. C. Thomann. 1980, 206p
MASEC-SCR-81-094
Contract AC02-79CS30150
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The potential of small wind energy conversion systems (SWECS) in a regional utility was investigated. Kansas Gas and Electric Company (KG and E), an investor-owned company with 1800-MW generating capacity, served as the case study subject. Eight previous studies that evaluated SWECS as an integral part of the generatin mix of a utility system were reviewed and summarized. A wind characteristics analysis was performed for the KG and E service territory. A hypothetical wind machine with a cut-in velocity of 8 mph and a rated velocity of 25 mph was selected and analyzed in the Wichita, Kansas wind regime. Five years of concurrent wind/load data were used to simulate 15 years of KG and E system operation with and without SWECS.

DE82014289 MF **A01**
Thermo Electron Corp., Waltham, MA.
Diesel Organic Rankine Bottoming Cycle Powerplant Program: Volume II. Industrial Waste Heat Applications. Final Report.
Oct 81, 82p DOE/CS/40097-1-V.2
Contract AC07-78CS40097
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Several industrial processes and facilities were evaluated as possible sites to demonstrate the application of an Organic Rankine Cycle system (ORCS) using Fluorinol-85 as the working fluid to effect industrial waste-heat recovery. The economic applications for ORCS's using Fluorinol as the working fluid are in situations where the temperature of the waste-heat stream is between 400 exp 0 and 1000 exp 0 F. A literature review indicated that the greatest potential and economic advantage for an industrial application for the recovery of waste heat by means of an ORCS using Fluorinol as the working fluid is from the exhausts of high-temperature furnaces and boilers for six major industry categories. Together they expend 80% of the US annual energy consumption in the industrial sector. From these categories, four potential applications were selected, specific information about plant characteristics was obtained, and detailed performance predictions were carried out for an ORC waste-heat recovery system operating in these plants. In addition, the performance of the existing demonstration system hardware was predicted for two recommended applications, the petroleum refinery and the steel mill, utilizing only a portion of the available exhaust gas flow. Only nominal modifications would be required to make the existing hardware suitable for a demonstration program for either of these recommended applications. (ERA citation 07:044043)

DE82014367 MF **A01**
Solar Energy Research Inst., Golden, CO.
Zn sub 3 P sub 2 as an Improved Semiconductor for Photovoltaic Solar Cells. Thirteenth Quarterly Report, September 1, 1981-November 30, 1981.
M. Bhushan, J. D. Meakin, and J. M. Pawlikowski.
Feb 82, 44p SERI/PR-8062-1-T15
Contract AC02-77CH00178
Portions of document are illegible.
Available in microfiche only.

Efforts to produce bulk n-type Zn sub 3 P sub 2 by incorporating Mg as an impurity have so far resulted in high resistivity p-type material. On the basis of the capacitance voltage characteristics of Mg diffused Zn sub 3 P sub 2 devices, a model in which Mg compensates the acceptor levels, creating a thin insulating region near the surface, was developed. In order to test the validity of this model, the thickness of the Mg diffused layer was measured by first heating a Mg/Zn sub 3 P sub 2 device to produce approx. 50 mu m thick Mg diffused layer and then measuring the device characteristics after successively removing a few mu m of the surface at a time. This experiment confirmed the results reported earlier on the basis on n/p junction formation. A study of the native oxide of Zn sub 3 P sub 2 produced by thermal oxidation was conducted for the development of MIS solar cells. The oxidized surface was composed of ZnO and P sub 2 O sub 5 and was found to contain excess zinc. The as-grown oxide layer in Zn sub 3 P sub 2 was electrically conducting and, therefore, not suitable for MIS cells. MIS cells produced by plasma oxidation of Zn sub 3 P sub 2 had V/sub oc/ approx. 0.5 Volts and J sub 0 approx. 10 exp -9 Amp/cm exp 2 . A software package to store, sort and retrieve the data generated by the production and testing of Zn sub 3 P sub 2 thin-film cells was developed. ZnSe/Zn sub 3 P sub 2 heterojunction devices prepared by vacuum evaporation of ZnSe had a maximum V/sub oc/ of 0.36 Volts and J/sub sc/ in the range of 0.1 and 0.7 mA/cm exp 2 . The resistivity of ZnSe films was lowered by annealing in the presence of zinc vapor at 400 exp 0 C. Al doping in ZnSe gave very leaky diodes and a lower V/sub oc/. Optical absorption measurements were made on thin ZnSe films deposited on glass by vacuum evaporation and close-spaced vapor transport.

DE82014595 MF **A01**
Resource Planning Associates, Inc., Washington, DC.
Institutional Applications of Solar Total-Energy Systems. Draft Final Report.
Jul 78, 79p DOE/ET/20264-T1-V.1
Contract AC04-77ET20264
Portions of document are illegible.
Available in microfiche only.

Conceptual designs are presented for thermal and photovoltaic solar total energy (STE) systems optimized to have the lowest possible life-cycle costs. An analysis is made of the market for STE systems, synthesizing the results of interviews with institutional-sector decision-makers and representatives of utilities, component manufacturers, architect/engineers, contractors, and labor unions. The operation and outputs of the market model developed to estimate potential STE system sales and resultant energy savings are presented. Outlined are the preliminary guidelines for selecting sites and conducting the planned federal demonstration program.

DE82014901 PC **A03**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA.
Analysis and Testing of the SELECS Methodology, and Users Guide to SELECS Software. Final Report.
R. G. Kramek, and J. C. Purcupile. 1982, 43p DOE/ET/00270-T1
Contract AS22-78ET00270
Portions of document are illegible.

The purpose of this report is twofold; first, to describe the analysis and testing of the SELECS Methodology for anomalies, and secondly, to present a users guide for the software implementation of the SELECS Methodology. The report consists of two major sections. The first section contains: a mathematical analysis of the SELECS Methodology, in which expressions are derived for writing values of site and process score sensitivity; a description of the software for testing the SELECS Methodology; and description and analysis of computer test runs of the SELECS Methodology, using randomized data for 167 test runs. The second section, which in the users guide contains: a description of the software programs SELECS, and CURVIA; and instructions for executing SELELS, CURVIA, and SELRND.

DE82014908 PC **A08**/MF **A01**
Argonne National Lab., IL.
Three-Dimensional Analysis of MHD Generators and Diffusers.
S. P. Vanka, R. K. Ahluwalia, and E. D. Doss. Mar 82, 162p ANL/MHD-82-4
Contract W-31-109-ENG-38
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The three-dimensional flow and heat transfer phenomena in MHD channels and diffusers are analyzed by solving the governing partial differential equations for flow and electrical fields. The equation set consists of the mass continuity equation, the three momentum equations, the equations for enthalpy, turbulence kinetic energy and its dissipation rate, and the Maxwell equations. This set of coupled equations is solved by the use of a finite-difference calculation procedure. The turbulence is represented by a two-equation model of turbulence in which partial differential equations are solved for the turbulence kinetic energy and its dissipation rate. Calculations have been performed for Faraday and diagonally-connected channels. Specifically, the AEDC (Faraday) and the UTSI (diagonal) channels have been analyzed, and the results are compared with experimental data. The agreement is fairly good for all the measured quantities. The effects of channel loading on the three-dimensional flow characteristics of Faraday and diagonally-connected generators have been also analyzed. A simple argument is presented to show qualitatively the role of MHD body forces in generating axial vorticity and hence secondary flows in the cross-stream. Calculations have also been made to study the flow evolution in MHD diffusers. The calculations show that the velocity overshoots and secondary flows decay along the diffusers length. Plots of velocity, skin friction and pressure recovery are presented to illustrate the flow development in MHD diffusers.

DE82015123 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Grumman WS33 Wind System. Phase II: Executive Summary. Prototype Construction and Testing.
F. M. Adler, P. Hinton, and P. W. King. 1 Nov 80, 15p RFP-3288/1
Contract AC04-76DP03533
Microfiche only after original copies are exhausted.

The configuration of an 8 kW wind turbine generator and its fabrication and pre-delivery testing are discussed. The machine is a three-bladed, down wind turbine designed to interface directly with an electrical utility network. Power is generated in winds between a cut-in speed of 4.0 m/s and a cut-out speed of 22 m/s. A blade pitch control system provides for positioning the rotor at a coarse pitch for start-up, fine pitch for normal running, and a feather position for shut-down. Operation of the machine is controlled by a self-monitoring, programmable logic microprocessor. System components were obtained through a series of make-buy decisions, tracked and inspected for specification compliance. Only minor modifications from the original design and minor problems of assembly are reported. Four accelerometers were mounted inside the nacelle to determine the accelerations, frequencies and displacements of the system in the three orthogonal axes. A cost analysis is updated.

DE82015255 MF **A01**
Sandia National Labs., Albuquerque, NM.
Low Cost Modular Designs for Photovoltaic Array Fields.
H. N. Post, D. C. Carmichael, and J. A. Castle. 1982, 5p SAND-81-2379C, CONF-820555-2
Contract AC04-76DP00789
Photovoltaic solar energy conference, Stresa, Italy, 10 May 1982, Portions of document are illegible.
Available in microfiche only.

Described are the design and development of optimized, modular array fields for photovoltaic (PV) systems. Design criteria and performance requirements have been defined and evaluated for specific array subsystems. These subsystems include support structures, foundations, intermodule connection, field wiring, lightning protection, system grounding, site preparation, and monitoring and control. Fully integrated flat-panel array-field designs, optimized for lowest life-cycle costs, have been developed for systems ranging in size from 20 to 500 kW/sub p/. These designs are applicable for near-term implementation

(1982 to 1983) and reduce the array-field balance-of-system (BOS) costs to a fraction of previous costs. Key features, subsystem requirements, and projected costs are presented and discussed.

DE82015261 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Subsystem Engineering and Development of Grid-Connected Photovoltaic Systems.
E. L. Burgess, H. N. Post, and T. S. Key. 1982, 10p
SAND-82-1151C, CONF-820555-3
Contract AC04-76DP00789
Photovoltaic solar energy conference, Stresa, Italy, 10 May 1982.

The experience gained in fielding residential and intermediate sized photovoltaic application experiments is summarized. This experience is used to guide the engineering and development of array and power conditioning subsystems for grid-connected photovoltaic systems. A major consideration in this development effort is cost. Through innovative engineering, using a modular building block approach for the array subsystem, it is now possible to construct array fields, in moderate quantities, for about $52/m exp 2 excluding the photovoltaic modules. Similarly, results of power conditioning subsystem development indicate a projected cost of about $0.25/W/sub p/ for advanced units with conversion efficiencies in excess of 90%.

DE82015472 PC **A02**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Development of Copper Sulfide/Cadmium Sulfide Thin-Film Solar Cells. Tenth Technical Progress Report, 1 October 1981-31 December 1981.
J. R. Szedon. 23 Apr 82, 24p SERI/PR-8143-1-T9
Contract AC02-77CH00178
Microfiche only after original copies are exhausted.

Three new stress/evaluation tubes have been assembled for use in aging and testing Cu sub 2 S/CdS cells in a controlled, flowing gas ambient. One of the tubes can be accommodated in a controlled humidity cabinet, which will allow acquisition of information on the temperature and humidity acceleration of degradation involving short-circuit current and diode opposing current in Cu sub 2 S/CdS cells. Evidence has been found which supports a structural origin for the deep-donor tunneling states which can control opposing current in these cells. An improved gas-handling system has been assembled to provide a high-humidity environment for aging cells at room temperature.

DE82015506 PC **A07**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Detailed Residential Photovoltaic-System Reference Designs. Final Report.
E. M. Mehalick, R. Landes, and N. Truncellito. Mar 82, 131p SAND-81-7182
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

Six detailed residential photovoltaic system designs are summarized. They are: (1) a photovoltaic system for an all-electric Southwest residence employing a direct mount array, (2) a photovoltaic/thermal side-by-side system for a Northeast residence, (3) a photovoltaic system with battery storage for the Southwest employing a standoff array, (4) a photovoltaic system for a passive house design for the Northeast, (5) a photovoltaic system for a Southeast residence employing an integral mount array, and (6) a photovoltaic system for a temperate climate with either a standoff or an integral mounted array. Besides a summary description of all the designs, a discussion is provided of the initial system configuration review and selection and a summary is provided of several design tradeoffs. Design issues and concerns are also discussed. For each design, the house description, system description, system operation, photovoltaic array, photovoltaic modules, power conversion subsystem, photovoltaic interface with the utility and house service, array sizing, and design performance are summarized.

DE82015585 PC **A05**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
Development of Molten-Carbonate Fuel-Cell Power Plant. Quarterly Technical Progress Report, May 1, 1981-July 31, 1981.
30 Oct 81, 86p DOE/ET/17019-6
Contract AC02-80ET17019
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The major objective of the program for development of a coal-fired molten carbonate fuel cell power plant is to establish and demonstrate readiness for fabrication and test of full-scale prototype stacks. Progress is reported on three program tasks. Under Task 1.0, cost estimates of the four candidate power plant designs were completed by the program participants. Under Task 2.0, the examination of electrode reaction mechanisms has identified a limiting current on gold and nickel wires in a stagnant melt which is a linear function of the concentration of available hydrogen to the wires. Evaluation of corrosion-resistant materials has identified a new alloy, IN 690, which has shown significant corrosion resistance in both the anode and the cathode gas environment. In addition, chromium-coated stainless steel shows superior corrosion resistance in an anode gas atmosphere; however, it does not appear to offer corresponding protection on the cathode side. In advanced component development, a layer of SrTiO sub 3 powder plated with Ni has been sintered to a layer of Ni-10Cr to form a bubble pressure barrier anode. Also, curling and cracking problems of 4 in. x 4 in. cathodes formed out-of-cell were solved. In another area, the spray-drying processing conditions and raw materials were varied in an effort to improve LiA10 sub 2 morphology and phase distributions. Only partial success was achieved in that high beta -phase content LiA10 sub 2 was produced but with lower than desired surface areas. Temperature mapping studies were performed on 4 in. x 4 in. bench-scale cells to identify performance sensitivity to temperature gradients. Lastly, in commercial-sized component work, temperature variations that caused density variations in the first 50 in. x 50 in. tile were eliminated by rearrangement of mold heaters.

DE82015660 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Intermediate Photovoltaic System Application Experiment Operational Performance. Executive Summary. Volume 6 for Beverly High School, Beverly, MA.
Apr 82, 7p SAND-81-7102/6
Contract AC04-76DP00789

Performance data are given for a 95 kW-peak grid connected flat panel photovoltaic power supply at a Massachusetts high school for the month of March 1982. Data presented include daily and monthly electrical energy produced by the photovoltaic system, daily and monthly solar energy incident in the plane of the array, efficiency of the solar cell array and of the power conditioner and of the system overall, the capacity factor, solar insolation, and the data acquisition mode and recording interval plot.

DE82015788 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Intermediate Photovoltaic System Application Experiment: Operation Performance Executive Summary. Volume 9. Lovington Square Shopping Center, Lovington, NM.
Apr 82, 6p SAND-81-7099/9
Contract AC04-76DP00789
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Performance data are given for a 100 kW peak flat panel grid connected photovoltaic power supply at a New Mexico shopping center for the month of March, 1982. Data include: daily and monthly electrical energy produced by the array field, daily and monthly incident solar energy in the plane of the collector, array efficiency, power conditioner efficiency, photovoltaic system efficiency, capacity factor, and insolation. Also included is a data acquisition mode and recording interval plot for the month.

DE82015789 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Intermediate Photovoltaic System Application Experiment Operational Performance Report. Volume 1 for CDC Light Manufacturing Bldg., San Bernardino, CA.
Apr 82, 42p SAND-81-7089/1
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

Performance data are given for a photovoltaic power supply at a California manufacturing building for the months of February and March 1982. Data include: daily and monthly electrical energy produced; daily and monthly incident solar energy; daily and monthly array efficiency; plots of energy produced as a function of power level, voltage, and hour of day; power conditioner input, output, and efficiency; daily and monthly photovoltaic energy to load; system efficiency; capacity factor; daily availability; hourly and monthly average insolation; hourly and monthly average wind speed; monthly heating and cooling degree days; hourly and monthly average ambient temperature; hourly average cell temperature; monthly wind direction distribution; and data acquisition mode and recording interval plot.

DE82015839 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Fuel-Cell Applied Research: Electrocatalysis and Materials. Quarterly Report, April 1-June 30, 1981.
W. E. O'Grady, J. McBreen, H. S. Isaacs, H. Olender, and J. Hughes. Jul 81, 8p BNL-51441
Contract AC02-76CH00016

Progress is briefly described on the four tasks: (1) effects of temperature and phosphoric acid concentration on oxygen reduction kinetics; (2) oxygen reduction kinetics in alternate acid electrolytes; (3) electrochemical surface science studies; and (4) organic oxidation reactions.

DE82015993 PC **A08**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Manufacturing Cost Analysis of 1980 Vintage Photovoltaic Arrays.
J. Chan. Apr 82, 173p SAND-81-7010
Contract AC04-76DP00789
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Three 1980 vintage concentrator hardware designs were analyzed to determine their production and installation cost potential based on a 10 exp 5 m exp 2 / year production rate. The three designs were: E-Systems' second-generation linear Fresnel, Sandia's TR-80 point-Focus Fresnel, and Sandia's sheet metal parabolic trough. The study was done to help DOE verify the achievement of its PV concentrator technology readiness goal of $2.80/Wp. A preliminary conceptual manufacturing facility was designed for the linear Fresnel array. The design includes floor plans indicating equipment and manufacturing layout, process/assembly flow sequence, equipment costs and sizes, and the manpower required to meet the 10 exp 5 m exp 2 /year production output.

DE82016122 MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Requirements for Optimization of Electrodes and Electrolyte for the Iron/Chromium Redox Flow Cell.
V. Jalan, H. Stark, and J. Giner. Sep 81, 81p DOE/NASA/0097-80/1, NASA-CR-165218
Contract AI04-80AL12726
Available in microfiche only.

The iron/chromium redox flow cell has become an attractive system for bulk energy storage application. Earlier investigations at Giner, Inc. had established that the solubility and stability of aqueous acidic solution of Cr(II) and Cr(III) chlorides are sufficient for redox applications and had resulted in a number of findings which have enhanced the attractiveness of the Cr(III)/Cr(II) vs. Fe(III)/Fe(II) redox cell. The discovery of gold/lead combination electrocatalyst has proved to be the only system to date that provides a high activity for Cr(III)/CR(II) redox reaction and very high hydrogen overvoltage. A combination of gold and lead deposited on porous carbon felt structure provided a practical electrode for the Cr side for the redox flow cell. Improved catalyzation techniques were developed that included a pretreatment of carbon substrate and provided normalized carbon surface for uniform gold deposition. This permitted to efficiently use different batches of carbon felt materials which initially vary significantly in their physical and surface chemical properties, as well as their electrochemical behavior. Further modifications of gold impregnation technique (an alcohol assisted technique) gave to date the best performing electrodes. In addition to the liner sweep voltammetry, cyclic voltammetry has been used to determine the effects of different activation procedures on the Cr(III)/Cr(II) redox and H sub 2 evolution reactions. Attempts are made to identify the roles of carbon, gold and lead in the overall redox cycle. The behavior of the electrodes at both normal battery operating potentials and more extreme potentials is discussed with the implications for preparing efficient and stable electrodes for the energy storage battery.

DE82017000 PC **A06**/MF **A01**
Sandia National Labs., Albuquerque, NM.
El Paso Electric Photovoltaic-System Analyses.
May 82, 121p SAND-82-7101
Contract AC04-76DP00789
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Four analyses were performed on the Newman Power Station PV system. Two were performed using the Photovoltaic Transient Analysis Program (PV-TAP) and two with the SOLCEL II code. The first was to determine the optimum tilt angle for the array and the sensitivity of the annual energy production to variation in tilt angle. The optimum tilt angle was found to be 2β exp 0 , and variations of 2 exp 0 produce losses of only 0.06% in the annual energy production. The second analysis assesses the power loss due to cell-to-cell variations in short circuit current and the degree of improvement attainable by sorting cells and matching modules. Typical distributions on short circuit current can cause losses of about 9.5 to 11 percent in peak array power, and sorting cells into 4 bins prior to module assembly can reduce the losses to about 6 to 8 percent. Using modules from the same cell bins in building series strings can reduce the losses to about 4.5 to 6 percent. Results are nearly the same if the array is operated at a fixed votage. The third study quantifies the magnitude and frequency of occurrence of high cell temperatures due to reverse bias caused by shadowing, and it demonstrates that cell temperatures achieved in reverse bias are higher for cells with larger shunt resistance. The last study assesses the adequacy of transient protection devices on the dc power lines to transients produced by array switching and lightning. Large surge capacitors on the dc power line effectively limit voltage excursions at the array and at the control room due to lightning. Without insertion of series resistors, the current may be limited only by cable and switch impedances, and all elements could be severely stressed.

DE82902081 MF **A01**
Fluor Engineers and Constructors, Inc., Irvine, CA.
Component Failure and Repair Data: Gasification-Combined-Cycle Power-Generation Units.
R. P. Dawkins, and J. A. Derdiger. Feb 82, 156p
EPRI-AP-2205
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Failure rates and average restore times are presented for generic types of equipment for a coal gasification combined cycle power generation plant. These were developed using published EEI data, a failure modes analysis procedure, and expert consensus method. The material was developed for use as input in assessing the reliability, availability, critical parts, and sensitivity to failure rates and repair time of a representative plant. These data are published separately because they present a complete and probably unique data set which it is believed will be found useful by other evaluators of such plants or subsystems. (ERA citation 07:053648)

DE82902171 PC **A05**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Analysis of the Amount of Energy and Material Used in the Packings of Liquid Nourishment and Luxuries. Volume 5. Inquiry of Consumers Behaviour Considering Packings and the Possibility of Their Recycling.
S. von Papen. Feb 81, 81p BMFT-FB-T-81-063
In German.
U.S. Sales Only.

The inquiry of the consumers was made in November 1978 and finished in June 1979. The objective was to find out if the consumer is ready to help recycle packings. Independent inquiries were made. It is concluded that much can be done for recycling of packings by the consumers. (ERA citation 07:044032)

DE82902363 PC **A02**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Analysis of the Amount of Energy and Material Used in the Packing of Liquid Food and Luxury Food. Volume 1. Introduction, Program and Objectives of the Project.
S. von Papen. Feb 81, 19p BMFT-FB-T-81-059
In German.
U.S. Sales Only.

The final report was presented in September 1979. Part 1 of this report includes the introduction, description of the work program, and the objectives of the project. The program and objectives include: analysis of the amount of energy and materials used in the production of packings from raw material up to packings ready for use, filling of the packings and transport to the consumers, and alternatives to the disposal of waste and/or recycling. In addition the opinion of consumers has been evaluated so as to improve the handling of packings. It is demonstrated that other products can be examined for a more efficient use of material and energy, as well as possibilities of recycling and/or waste disposal. (ERA citation 07:044028)

DE82903116 PC **A07**/MF **A01**
Borg-Warner Corp., Carson, CA. Byron Jackson Pump Div.
Feed-Pump Hydraulic Performance and Design Improvement, Phase I: Research Program Design. Final Report.
W. H. Brown, S. Gopalakrishnan, R. Fehlau, W. E. Thompson, and D. G. Wilson. Mar 82, 149p EPRI-CS-2323-V.1

As a result of prior EPRI-sponsored studies, it was concluded that a research program should be designed and implemented to provide an improved basis for the design, procurement, testing, and operation of large feed pumps with increased reliability and stability over the full range of operating conditions. This two-volume report contains a research plan which is based on a review of the present state of the art and which defines the necessary R and D program and estimates the benefits and costs of the program. The recommended research program consists of 30 interrelated tasks. It is designed to perform the needed research; to verify the results; to develop improved components; and to publish computer-aided design methods, pump specification guidelines, and a troubleshooting manual. Most of the technology proposed in the research plan is applicable to nuclear power plants as well as to fossil-fired plants. This volume discusses the design, performance and failures of feed pumps, and recommendations for research on pump dynamics, design, and specifications. (ERA citation 07:043247)

DE82904652 MF **A01**
Pickard-Lowe and Garrick, Inc., Irvine, CA.
Power Plant Availability Engineering: Methods of Analysis, Program Planning, and Applications. Final Report.
B. J. Garrick, and S. Kaplan. May 82, 595p EPRI-NP-2168
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Availability engineering has its roots primarily in reliability work that is associated with the defense, communications, and aerospace industries. With respect to power plant applications, nuclear power plant risk analysis is an example of a more recent, important contributor to the technology of reliability and availability. This is particularly true in the systems modeling and data handling areas. Of course, the growing interest in more formal availability improvement programs in the power field has resulted in the most important resource for the advancement of power plant availability engineering. The keystone to contemporary availability analysis and engineering is its usefulness in making good decisions about power plant design and operations. The advocated approach fits the framework of a decision model, whereby different options for design, operations, etc., can be compared in terms of availability performance, costs, and benefits. The important building block needed for availability analysis to fit in a decision model is the quantification of uncertainty. Probability is adopted as the language of uncertainty. The concept of probability proposed is based on a state-of-knowledge approach. Such an approach provides the flexibility to model a plant and its systems at any point of the design or operations and with any data base (limited or comprehensive). The figures of merit (failure frequency, outage times, availability, etc.) are presented as probability distributions, thus.

N82-31348/7 PC **A03**/MF **A01**
Lockheed Missiles and Space Co., Inc., Sunnyvale, CA.
Multi-100 kw: Planar Low Cost Solar Array Development.
Final Review Report.
Jun 82, 45p NAS 1.26:162067, NASA-CR-162067
Contract NAS8-32981

The development of a 100 kW planar low cost solar array is presented. Tasks are defined, objectives are stated, and test results are given. A study of alternate contact configuration concluded that gridded back contact cells sharply reduced solar absorptance, that copper contacts will require a developmental program before interface can be achieved, and that gridded back contact cells using Ti-Pd-Ag as the contact materials appear to be the most cost-effective design.

N82-31349/5 PC **A05**/MF **A01**
Lockheed Missiles and Space Co., Inc., Sunnyvale, CA.
Multi-100 kw: Planar Low Cost Solar Array Development.
Final Report, 1 Sep. 1981 - 31 Jul. 1982.
Jun 82, 76p NAS 1.26:162068, LMSC-D843500, NASA-CR-162068
Contract NAS8-32981
Original Contains Color Illustrations.

The applicability of selected low cost options to solar array blanket design was studied by fabricating representative modules and submitting them to thermal cycle environment. Large area (5.9 x 5.9 cm) solar cells of 3 varieties were purchased: (1) Standard wraparound, (2) Copper contacts substituted for the conventional Titanium-Palladium-Silver, and (3) Standard wraparound except with gridded back contact instead of continuous metallization. The baseline cell was purchased to compare fabrication cost and to serve as a control cell during test evaluation of the other two cells. All cells were assembled into either substrate modules where the cell is individually filtered and welded to an integrated Kapton-copper circuit or into a superstrate configuration with 4 cells jointly adhered to a single sheet of microsheet and then welded to the integrated Kapton-copper circuit. Cell quality, particularly in the metallization of contacts, was less than desired. Problems were encountered with copper metallization in laying down a barrier metal which would ohmically bond to the silicon. The cells received were shunted (sintered) or with low contact pull strength (non-sintered), thus leading to the decision to solder rather than weld the copper cells to the Kapton substrate.

N82-31443/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Effects of Processing and Dopant on Radiation Damage Removal in Silicon Solar Cells.
I. Weinberg, H. W. Brandhorst, Jr., C. K. Swartz, and S. Mehta. 1982, 15p NAS 1.15:82892, E-1270, NASA-TM-82892
Presented at the 3RD European Symp. On Photovoltaic Generators in Space, Bath, England, 4-6 May, 1982; Sponsored by Rae, the U.K. Dept. Of Industry and Esa.

Gallium and boron doped silicon solar cells, processed by ion-implantation followed by either laser or furnace anneal were irradiated by 1 MeV electrons and their post-irradiation recovery by thermal annealing determined. During the post-irradiation anneal, gallium-doped cells prepared by both processes recovered more rapidly and exhibited none of the severe reverse annealing observed for similarly processed 2 ohm-cm boron doped cells. Ion-implanted furnace annealed 0.1 ohm-cm boron doped cells exhibited the lowest post-irradiation annealing temperatures (200 C) after irradiation to 5 x 10 to the 13th e(-)/sq cm. The drastically lowered recovery temperature is attributed to the reduced oxygen and carbon content of the 0.1 ohm-cm cells. Analysis based on defect properties and annealing kinetics indicates that further reduction in annealing temperature should be attainable with further reduction in the silicon's carbon and/or divacancy content after irradiation.

N82-31718/1 PC **A03**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Aerodynamic Forces Acting on the Blades of Stall Regulated Propeller Type Windmills.
F. Rasmussen. Aug 81, 37p DE82-901178, RISO-M-2316
Text in Danish.

Aerodynamic forces acting on the blades of stall regulated propeller type windmills are discussed. The expected dynamic behavior of the loads are outlined. Great dynamic loads under stall condition and skew wind (yaw or tilt) are shown by theoretical calculations from the blade element theory for one typical design. The forces on the three blades are calculated as well as the total forces from the rotor acting on the main shaft. Blade strut forces on a 10 m diameter, three blades Riisager windmill are measured.

N82-31771/0 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Experimental Evaluation of the Battelle Accelerated Test Design for the Solar Array at Mead, Nebraska.
P. O. Frickland, and J. Repar. 6 Apr 82, 46p NAS 1.26:169281, JPL-PUB-82-52, NASA-CR-169281
Contracts NAS7-100, NAS7-100DE-AI01-76ET-20356

A previously developed test design for accelerated aging of photovoltaic modules was experimentally evaluated. The studies included a review of relevant field experience, environmental chamber cycling of full size modules, and electrical and physical evaluation of the effects of accelerated aging during and after the tests. The test results indicated that thermally induced fatigue of the interconnects was the primary mode of module failure as measured by normalized power output. No chemical change in the silicone encapsulant was detectable after 360 test cycles.

N82-31773/8 PC **A06**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Photovoltaic Module Encapsulation Design and Materials Selection, Volume 1.
E. Cuddihy, W. Carroll, C. Coulbert, A. Gupta, and R. H. Liang. 1 Jun 82, 166p NAS 1.26:169265, JPL-PUBL-81-102-V-1, NASA-CR-169265
Contracts NAS7-100, DE-AI01-76ET-20356

Encapsulation material system requirements, material selection criteria, and the status and properties of encapsulation materials and processes available are presented. Technical and economic goals established for photovoltaic modules and encapsulation systems and their status are described. Available encapsulation technology and data are presented to facilitate design and material selection for silicon flat plate photovoltaic modules, using the best materials available and processes optimized for specific power applications and geographic sites. The operational and environmental loads that encapsulation system functional requirements and candidate design concepts and materials that are identified to have the best potential to meet the cost and performance goals for the flat plate solar array project are described. Available data on encapsulant material properties, fabrication processing, and module life and durability characteristics are presented.

N82-31774/4 PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Photothermal Characterization of Encapsulant Meterials for Photovoltaic Modulse.
R. H. Liang, A. Gupta, and S. Distefano. 1 Jun 82, 77p NAS 1.26:169267, JPL-PUBL-82-42, NASA-CR-169267
Contracts NAS7-100, DE-AI01-76ET-20356

A photothermal test matrix and a low cost testing apparatus for encapsulant materials of photovoltaic modules were defined. Photothermal studies were conducted to screen and rank existing as well as future encapsulant candidate materials and/or material formulations in terms of their long term physiochemical stability under accelerated photothermal aging conditions. Photothermal characterization of six candidate pottant materials and six candidate outer cover materials were carried out. Principal products of photothermal degradation are identified. Certain critical properties are also monitored as a function of photothermal aging.

N82-31775/1 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
An Investigation of the Effect of Wind Cooling on Photovoltaic Arrays.
L. Wen. Mar 82, 50p NAS 1.26:169263, JPL-PUBL-82-28, NASA-CR-169263
Contracts NAS7-100, DE-AI01-76ET-20356

Convective cooling of photovoltaic modules for different wind conditions, including steady state controlled testing in a solar simulator and natural test environments in a field was investigated. Analytical thermal models of different module designs were used to correlate experimental data. The applicability of existing heat transfer correlations is confirmed. Reasonable agreement is obtained by applying a power law wind profile.

N82-31777/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
On the Cause of the Flat-Spot Phenomenon Observed in Silicon Solar Cells at Low Temperatures and Low Intensities.
V. G. Weizer, J. D. Broder, H. W. Brandhorst, and A. F. Forestieri. 1982, 14p NAS 1.15:82903, E-1286, NASA-TM-82903
Presented at the 3RD European Symp. On Plotovoltaic Generators in Space, Bath, England, 4-6 May, 1982; Sponsored by Rae, U.K. Dept. Of Industry and Esa.

A model is presented that explains the 'flat-spot' (FS) power loss phenomenon observed in silicon solar cells operating deep space (low temperature, low intensity) conditions. Evidence is presented suggesting that the effect is due to localized metallurgical interactions between the silicon substrate and the contact metallization. These reactions are shown to result in localized regions in which the PN junction is destroyed and replaced with a metal-semiconductor-like interface. The effects of thermal treatment, crystallographic orientation, junction depth, and metallurization are presented along with a method of preventing the effect through the suppression of vacancy formation at the free surface of the contact metallization. Preliminary data indicating the effectiveness of a TiN diffusion barrier in preventing the effect are also given.

PAT-APPL-6-393 268 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Back Barrier Heteroface AlGaAs Solar Cell.
Patent Application,
W. Patrick Rahilly. Filed 29 Jun 82, 23p AD-D009 707/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This is an improvement to the AlGaAs/GaAs heteroface solar cell in that the photovoltaically active region is composed of AlGaAs of low Al composition (approximately 2% to 10%) and is bounded by the usual high Al content (approximately 90% or more)AlGaAs window on the cell top and a novel high Al content (more than about 90%) back barrier. The back barrier serves to significantly reduce minority carrier losses in the rear region by blocking the carriers from reaching the cell substrate region. The result is that both light generated current and cell voltage performance will be improved. (Author)

PATENT-4 331 742 Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Solid Electrolyte Cell.
Patent,
R. Richter. Filed 24 Dec 80, patented 25 May 82, 6p N82-29710/2, PAT-APPL-6-220 214
Supersedes PAT-APPL-6-220 214, N81-16385 (19 - 07, p 0907).Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A solid electrolyte cell including a body of solid ionized gas-conductive electrolyte having mutually spaced surfaces and on which is deposited a multiplicity of mutually spaced electrodes is described. Strips and of bare substances are interposed between electrodes, so that currents of ionic gas may be established between the electrodes via the bare strips, whereby electrical resistance for the cells is lowered and the gas conductivity is enhanced.

PATENT-4 335 503 Not available NTIS
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Method of Making a High Voltage V-Groove Solar Cell.
Patent,
J. C. Evans, Jr., A. T. Chai, and C. P. Goradia. Filed 24 Dec 80, patented 22 Jun 82, 6p N82-29709/4, PAT-APPL-6-219 678
Supersedes PAT-APPL-6-219 678, N81-16529 (19 - 07, p 0927).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A method is provided for making a high voltage multijunction solar cell. The cell comprises a plurality of discrete voltage generating regions, or unit cells, which are formed in a single semiconductor wafer and are connected together so that the voltages of the individual cells are additive. The unit cells comprise doped regions of opposite conductivity types separated by a gap. The method includes forming V-shaped grooves in the wafer and thereafter orienting the wafer so that ions of one conductivity type can be implanted in one face of the groove while the other face is shielded. A metallization layer is applied and selectively etched away to provide connections between the unit cells.

PB83-121723 PC **A09**/MF **A01**
United Technologies Corp., South Windsor, CT. Power Systems Div.
On-Site Fuel Cell Field Test Support Program.
Annual rept. May 80-Jun 81,
J. W. Staniunas, and G. P. Merten. Jan 82, 199p FCR-3859, GRI-81/0034
Contract GRI-5080-344-0308

In order to assess the impact of grid connection on the potential market for fuel cell service, applications studies were conducted to identify the fuel cell operating modes and corresponding fuel cell sizing criteria which offer the most potential for initial commercial service. The market for grid-connected fuel cell service was quantified using United's market analysis program and computerized building data base. Electric and gas consumption data for 268 buildings was added to our surveyed building data file, bringing the total to 407 buildings. These buildings were analyzed for grid-isolated and grid-connected fuel cell service. The results of the analyses indicated that the nursing home, restaurant and health club building sectors offer significant potential for fuel cell service. The building data file and the building energy correlations will be updated as additional data becomes available and the fuel cell application studies will be expanded.

PB83-800722 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fuel Cells. December, 1981-September, 1982 (Citations from the NTIS Data Base).
Oct 82, 186p
Supersedes PB82-802836 and PB80-813397.

Fuel cell applications, components, fabrication, design, catalysts, and chemistry are covered. The bibliography includes different types of fuel cells, such as hydrogen-oxygen cells, hydrocarbon-air cells, and biochemical cells. (This updated bibliography contains 177 citations, all of which are new entries to the previous edition.)

PB83-852442 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Ocean Thermal and Wind Power Plants and Power Generation: Economic Analysis. 1972-October, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1972-Oct 82.
Oct 82, 243p
Supersedes PB82-859737.Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

This bibliography contains citations concerning economic analyses and evaluations of techniques and technology for ocean thermal energy and small and large wind energy conversion systems and apparatus. Government policies and economic incentives to commercialization world-wide are cited, along with considerations of economic prospects and feasibility. (This updated bibliography contains 252 citations, 33 of which are new entries to the previous edition.)

10C. Energy Storage

AD-A119 555/1 MF **A01**
Army Logistics Center, Fort Lee, VA.
Independent Evaluation Plan (IEP) for Sealed Nickel-Cadmium (NICAD) Battery Support.
7 Sep 82, 34p
Availability: Microfiche copies only.

Test objectives were (1) to evaluate the POC and direct exchange procedures to provide responsive and effective battery support under combat conditions, and (2) to evaluate whether or not the PP-7286/U battery charger can charge the volume and diversity of type batteries under conditions utilizing the POC and established direct exchange procedures.

DE82008192 PC **A02**/MF **A01**
Sandia National Labs., Livermore, CA.
Numerical Study of Natural Convection in a Vertical, Annular, Porous Layer.
C. E. Hickox, and D. K. Gartling. 1982, 22p SAND-81-2095C, CONF-820604-6
Contract AC04-76DP00789
AIAA/ASME joint conference on fluids, plasma, thermophysics and heat transfer, St Louis, MO, USA, 7 Jun 1982.

Results of a numerical study of steady, natural convection in a fluid-saturated, vertical, annular, porous layer are reported. The analysis is performed using a finite element computer program based on the Galerkin form of the finite element method. Heat transfer rates are predicted for Rayleigh numbers in the range 25 to 100 with layer aspect ratios ranging from 2 to 8 and ratios of layer height-to-inner radius of 2, 4, and 8. Representative plots of isotherms and streamlines are also presented. Effects of anisotropic permeability are evaluated in a preliminary manner. Application of the results to an insulated storage tank is illustrated.

DE82009826 PC **A06**/MF **A01**
Dow Chemical U.S.A., Walnut Creek, CA.
Development of a Sodium-Sulfur Battery Suitable for Use by Electric Utilities and for Vehicular Propulsion. Final Report, March 1979-May 10, 1981.
C. A. Levine. 1981, 125p DOE/ET/25103-T1
Contract AC02-76ET25103
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Research progress on The Development of a Hollow Glass Fiber Na-S Battery from April 1979 through May 10, 1981, is reported. Cell lifetimes have been increased, averaging 47 days and 113 cycles with a maximum of 375 days and 777 cycles on continuous deep charge/discharge at a 6 hour rate. Some failure modes have been determined. Fiber degradation and changes in cathode foil operation were studied. New tubesheet structures and less expensive cell cases were developed. The cost for sale of the bare 400 ampere-hour cell (1981 $) is $39.78/kWh in a stainless steel case and $29.06/kWh in the aluminum case. (ERA citation 07:043769)

DE82012418 PC **A16**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
International Conference on Seasonal Thermal-Energy Storage and Compressed-Air Energy Storage.
1981, 356p PNL-SA-10347-V.2, CONF-811066-Vol.2
Contract AC06-76RL01830
International energy storage conference, Seattle, WA, USA, 19 Oct 1981, Portions of document are illegible.
Microfiche only after original copies are exhausted.

Thirty-five papers were presented at the meeting. A separate abstract was prepared for each of 31 papers. Four papers were previously processed for the Energy Data Base.

DE82013327 MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Performance Characteristics of an Electric-Vehicle Lead-Acid Battery Pack at Elevated Temperatures.
P. Chapman. 1 Apr 82, 42p DOE/CS/54209-8
Contract AI01-78CS54209
Portions of document are illegible.
Available in microfiche only.

Data are presented for discharge testing of an 18-Exide IV electric car battery pack over initial electrolyte temperature variations between 27 and 55 exp 0 C. The tests were conducted under laboratory conditions and then compared to detailed electric vehicle simulation models. Results showed that battery discharge capacity increased with temperature for constant current discharges, and that battery energy capacity increased with temperature for constant power discharges. Dynamometer test of the GE Electric Test Vehicle showed an increase in range of 25% for the highest electrolyte temperature.

DE82013343 PC **A03**/MF **A01**
Union Carbide Corp., Oak Ridge, TN. Computer Sciences Div.
Aspects of the Computer Simulation of Conduction Heat Transfer and Phase Change Processes.
A. D. Solomon. Apr 82, 26p ORNL/CSD-100
Contract W-7405-ENG-26

Various aspects of phase change processes in materials are discussd including computer modeling, validation of results and sensitivity. In addition, the possible incorporation of cognitive activities in computational heat transfer is examined. (ERA citation 07:043756)

DE82014399 MF **A01**
Naval Research Lab., Washington, DC.
Research on Lead Acid Battery Electrodes. Final Report.
A. C. Simon, S. M. Caulder, C. P. Wales, and R. L. Jones. 26 Feb 82, 105p NRL-MR-4751
Contract AI01-76ET25002
Available in microfiche only.

The reactions and physical and molecular transformations that occur in lead acid battery plate active material during charge-discharge cycling have been studied under a DOE program to improve the lead acid battery for electric vehicle applications. Investigations included structural studies of PbO sub 2 by x-ray/neutron diffraction, effects of cycling on capacity by pulsed vs unpulsed discharge, active material microstructure/plate capacity changes under high EV-type discharge rates, coralloid structure formation in cycled positive plated, and tubular plate active material changes during formation and cycling.

DE82015798 PC **A03**/MF **A01**
General Electric Co., St. Petersburg, FL. Neutron Devices Dept.
Li(B) Ingot Preparation Scale-Up Study. Final Report.
R. Szwarc, and S. Dallek. 14 May 82, 44p GEPP-TM-645
Contract AC04-76DP00656
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Results of the investigation to determine the feasibility of scaling the lithium-boron alloy preparation from laboratory to commercial scale are reported. Earlier reports have demonstrated the usefulness of this alloy for anodes in thermal batteries which operate at temperatures well above th melting point of lithium. Electrochemically, the alloy behaves very much like lithium, attaining a potential only 20 mV below lithium when discharged in a LiCl-KCl eutectic melt. Its discharge characteristics under heavy loads suggest that the anode behaves as if the active species were molten, yet the anode remains a solid at operating temperatures. Single cells employing this anode were developed and described earlier. A single cell consists of three components, an anode, a separator layer and a catholyte layer. The anode is made up of foil as thin as 0.003 inch spotwelded on a 0.005-inch thick stainless steel collector. The separator layer is an electrolyte-MgO mixture. Its purpose is to prevent direct contact and therefore reaction between the anode and the active cathode material. Many separator configurations were investigated earlier; our final choice has now been adopted for all thermal batteries employing lithium compound anodes. The catholyte layer is a mechanical mixture of FeS sub 2 and electrolyte powder. Both the separator and the catholyte are pressed powder pellets. Alloy preparation and physical properties are reported, and test results are detailed.

DE82750015 MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Investigation of Medium and High-Temperature Phase Change Materials for Thermal Energy Storage.
D. Heine, F. Heess, and D. Steiner. Aug 81, 110p BMFT-FB-T-81-149
In German.Portions of document are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Limited information is currently available on the long-time behaviour of heat storage materials. The present work relates to investigations in the temperature ranges 200 to 450 exp 0 C and 700 to 900 exp 0 Cc. These investigations comprise the corrosion of structural materials together with promising storage materials and the thermal stability and the melting and freezing behaviour of the storage materials. The mass losses of sheet metal samples are measured from the corrosion tests ant thickness reduction and corrosion rate are calculated. The corrosion type is determined using microscopes. Furthermore, melting and freezing curves are continually measured during cycling tests. The thermal stability of the storage materials is thereby determined as a function of the melting and freezing properties. The combinations mild steel with NaNO sub 3 , boiler steel with KCl-ZnCl sub 2 , NaNO sub 3 and MgCl sub 2 -NaCl and NICu30Fe with KCl-ZnCl sub 2 were found to be compatible in the temperature range 200 to 450 exp 0 C. However, no compatible combinations of structural and heat storage materials were found in the temperature range 700-900 exp 0 C. It is shown that the use of latent heat stores results in important oil saving in base load power plants for meeting peak load demands, in installations that use waste heat, and in night storage electric heaters. (ERA citation 07:047005)

DE82900640 PC **A03**/MF **A01**
Technical Univ. of Denmark, Lyngby. Thermal Insulation Lab.
Literary Study and Evaluation of Chemical Heat Storage.
P. L. Christensen. 1980, 29p DTH-LV-MEDD-90
In Danish.
U.S. Sales Only.

A review of thermochemical heat storage, chemical heat pumps, and (chemical) heat pipes is presented. The heat storage possibilities are evaluated with a view to practical use, and energy density values are given. Chemical heat storage is technically feasible but only economical in highly insulated buildings, combined with solar heating. Existing chemical heat storage systems in Sweden and U.S.A. are mentioned. (ERA citation 07:043760)

DE82902367 MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Galvanic High Energy Cells with Molten Salt Electrolyte.
W. Borger, W. Kappus, D. Kunze, H. Laig-Hoerstebrock, and H. Panesar. Feb 81, 126p BMFT-FB-T-81-048
In German.
U.S. Sales Only. Available in microfiche only.

LiAl/LiCl-Kcl/FeS engineering scale cells with 100 and 200 Ah capacity were developed. More than 300 deep cycles and 50 Wh/kg in 200 Ah cells were demonstrated. Separator development for LiAl/FeS cells was focussed on ceramic powders. The results with aluminum nitride powder separator indicate that this is a promising separator for LiAl/FeS cells. The further development of these cells includes the improvement of specific energy and cycle life as well as ceramic powder separators. (ERA citation 07:043763)

DE82903307 MF **A01**
Massachusetts Univ., Amherst.
Geotechnical Basis for Underground Energy Storage in Had Rock. Final Report.
O. C. Farquhar. Mar 82, 409p EPRI-EM-2260
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Underground pumped hydroelectric storage requires the excavation of caverns in hard rock. Hard rock caverns, also, are one option for compressed air storage. Preliminary design studies for both technologies at a specific site in Maryland were completed recently by EPRI, DOE, and the Potomac Electric Power Company. The present report deals with the geotechnical aspects of these storage systems from a generic viewpoint. Because both technologies are virtually new to the electric utility industry, information about effective use of hard rock openings, including tunnels and shafts, comes mainly from other types of underground projects. These are power houses for hydroelectric and conventional pumped storage schemes, as well as transportation facilities and mines. Rock strength, support, instrumentation, costs, management, and experi-

mental work are among the items considered in the report. Mapping of geologic structures, rock fragmentation, and rock mass properties is also discussed. The general conclusions are that rock types favorable for underground energy storage are present at suitable depths in many areas and that they can be identified by adequate geotechnical exploration prior to detailed design. Review of the documentary evidence in rock mechanics and related fields indicates that construction can meet reasonable time and cost schedules and that operation of the underground openings should be on a maintenance-free, near-permanent basis. (ERA citation 07:043745)

N82-31459/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Design Flexibility of Redox Flow Systems.
N. H. Hagedorn, and L. H. Thaller. 1982, 18p NAS 1.15:82854, E-1223, NASA-TM-82854
Contract DE-AI04-80AL-12726
Presented at the Intersoc. Energy Conversion Eng. Conf., Los Angeles, 8-13 Aug. 1982.

The characteristics inherent in Redox flow systems permit considerable latitude in designing systems for specific storage applications. The first of these characteristics is the absence of plating/deplating reactions with their attendant morphology changes at the electrodes. This permits a given Redox system to operate over a wide range of depths of discharge and charge/discharge rates. The second characteristic is the separation of power generating components (stacks) from the energy storage components (tanks). This results in cost effective system design, ease of system growth via modularization, and freedom from sizing restraints so that the whole spectrum of applications, from utilities down to single residence can be considered. The final characteristic is the commonality of the reactant fluids which assures that all cells at all times are receiving reactants at the same state of charge. Since no cell can be out of balance with respect to any other cell, it is possible for some cells to be charged while others are discharging, in effect creating a DC to DC transformer. It is also possible for various groups of cells to be connected to separate loads, thus supplying a range of output voltages. Also, trim cells can be used to maintain constant bus voltage as the load is changed or as the depth of discharge increases. The commonality of reactant fluids also permits any corrective measures such as rebalancing to occur at the system level instead of at the single cell level.

N82-31780/1 PC **A03**/MF **A01**
Sveriges Lantbruksuniversitet, Lund. Institutionen foer Lantbrukets Byggnadsteknik.
Preparatory Experiments on Seasonal Storage in Earth of Excess Heat from Greenhouse.
M. Areskoug, and P. Wigstroem. 1980, 50p DE82-900623, SLU-LBT-11
Text in Swedish.

An earth heat accumulator, directly beneath an experimental greenhouse, with possibilities for collecting excess solar heat by pumps and utilization of low temperature heat was investigated. Heat exchange with the accumulator is made by a system of buried polyethylene pipes. The heat accumulator was loaded by excess solar heat from the greenhouse, using heat pumps, during two summer months. A theoretical model for the heat flow in the accumulator was used to study the heat balance in the accumulator and its interaction with surrounding soil and greenhouse. The heat flow through the soil surface is utilized by the greenhouse giving a higher root zone temperature and a higher air temperature. It is suggested that a heat accumulator should be placed deeper beneath the soil surface. Its extension in depth should be larger, (about 10 to 15 m) in the specific boulder clay investigated. It is concluded that the method which uses buried horizontal pipes is not usable, and a technique for vertical pipe systems with high heat transfer must be investigated.

PAT-APPL-6-383 068 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Saltless Solar Pond.
Patent Application,
E. I. H. Lin. Filed 28 May 82, 24p N82-29714/4, NASA-CASE-NPO-15808-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A specifically-designed honeycomb structure is placed on the surface permits penetration of short wave solar radiation into the water, but efficiently insulates the resulting heated body of water from losing heat to the atmosphere by conduction, convection or infrared radiation. The honeycomb structure includes several honeycomb panels which are mounted adjacent to one another in a modular fashion to float on the surface of the water. Each honeycomb panel includes a multitude of honeycomb cells having a height-to-width or aspect ratio of at least approximately 14 to 1. The honeycomb cells effectively suppress convection of air in the panels. A radiation shield, comprising a cross-plate mounted substantially in the midsection of each cell, significantly reduces heat losses by infrared radiation.

PB83-851493 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electric Batteries With Biomedical Applications. 1971-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1971-Oct 82.
Oct 82, 117p

This bibliography contains citations concerning the technology and performance of electric primary and secondary batteries with biomedical applications. The criteria for cardiac pacemakers and prosthetic devices are discussed. Lithium anode batteries with varying cathode compositions are examined in terms of energy density, self discharge, and other performance characteristics. (Contains 109 citations fully indexed and including a title list.)

11. MATERIALS

11A. Adhesives and Seals

DE82901870 MF **A01**
AiResearch Mfg. Co. of California, Torrance.
Analysis of Thermal and Mechanical Stresses in the Ceramic Seal of the 1-MW(TH) Bench-Model Solar Receiver. Final Report.
Feb 82, 192p EPRI-AP-2267
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

A study was undertaken to assess both analytically and experimentally the thermal/mechanical stress levels associated with the hot tube to manifold ceramic joint for the 1-Mw/sub t/ bench model solar receiver (BMSR) and to define appropriate design and/or material changes for this joint to provide an acceptably low probability of failure. To this end, thermal shock/thermal gradient and combined thermal/mechanical loading tests were designed, analytically modeled, experimentally carried out, and subsequently analyzed. Analysis of the current BMSR ceramic joint design and materials revealed that a rather low probability of success would be expected. From the experiments performed it was deduced that the current disc material has an apparent Weibull modulus of three to five for the Si sub 3 N sub 4 discs and slightly greater than ten for the SiC discs. The thermal resistance at the tube/disc interface was found to decrease significantly with the increased surface contact area due to hand lapping the tube into the disc seat. This resulted in significantly increasing the thermal gradient across the disc, which in turn produced higher stresses in the discs. The parametric Weibull analysis and proven properties of high-performance hot pressed Si sub 3 N sub 4 indicate that the BMSR can have high probability of success (i.e., greater than 93 percent) when Si sub 3 N sub 4 discs with a Weibull modulus of ten are used, even when the thermal contact resistance at the tube disc interface is reduced to zero. A very significant increase in the BMSR reliability can be achieved through extensive inspection, quality control, and proof testing of all the ceramic components. A proof test plan was developed to allow proof testing of Si sub 3 N sub 4 discs to yield a total disc reliability of greater than 99 percent. (ERA citation 07:042912)

PAT-APPL-6-393 266 PC **A03**/MF **A01**
Department of the Air Force, Washington, DC.
Hermetic Package Using Membrane Seal.
Patent Application,
Louis D. Simmons. Filed 29 Jun 82, 26p AD-D009 705/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved solderable hermetically sealed container and method for sealing same is provided which comprises in a preferred embodiment, a hollow container having a solderable peripheral surface defining the opening to the container, a thin, solderable metallic membrane covering the opening and solderable surface of the container, a solder seal interfacing the membrane and the solderable surface of the container, and a protective lid covering the membrane and being removably attached to the container body. If desired, an adhesive seal between the membrane and protective lid may be provided to protect the membrane from excessive vibration. (Author)

PATENT-4 336 276 Not available NTIS
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Fully Plasma-Sprayed Compliant Backed Ceramic Turbine Seal.
Patent,
R. C. Bill, and D. W. Wisander. Filed 30 Mar 80, patented 22 Jun 82, 4p N82-29453/9, PAT-APPL-6-145 209
Supersedes PAT-APPL-6-145 209, N80-24619 (18 - 15, p 1985).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A seal having a high temperature abradable lining material encircling the tips of turbine blades in turbomachinery is discussed. The minimum operating clearances between the blade tips and the lining of a high pressure turbine are maintained. A low temperature easily decomposable material, such as a polymer, in powder form is blended with a high temperature oxidation resistant metal powder. The two materials are simultaneously deposited on a substrate formed by the turbine casing. Alternately, the polymer powder may be added to the metal powder during plasma spraying. A ceramic layer is then deposited directly onto the metal polymer composite. The polymer additive mixed with the metal is then completely volatilized to provide a porous layer between the ceramic layer and the substrate.

PATENT-4 338 368 Not available NTIS
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Attachment System for Silica Tiles.
Patent,
R. L. Dotts, and J. W. Holt. Filed 17 Dec 80, patented 6 Jul 82, 7p N82-29456/2, PAT-APPL-6-217 336
Supersedes PAT-APPL-6-217 336, N81-16110 (19 - 07, p 0868).Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

An improved method for markedly increasing the bond strength between a rigid, porous refractory material and non-rigid substrate by densifying the face of the rigid material opposing the substrate is discussed. Densification is accomplished by wetting the refractory material and then impregnating it with a composite slurry having a particle size to fill voids of the porous material.

PB83-851675 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Natural Adhesives. June, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 84p
Supersedes PB80-854177.

This bibliography contains citations concerning the research and development of adhesives manufactured and obtained from natural sources. Natural rubber, natural latex, animal tissue, lignin by-products, papyrus and corn stalks are among the materials examined. Applications in paper products and as pressure sensitive adhesives are discussed. (This updated bibliography contains 70 citations, 12 of which are new entries to the previous edition.)

11B. Ceramics, Refractories, and Glasses

AD-A119 725/0 PC **A04**/MF **A01**
Washington Univ., Seattle. Coll. of Engineering.
The Wetting Behavior of Yttria-Alumina-Silica Additives for Pressureless Sintering of Silicon Nitride.
Final rept. Jul 79-Jan 81,
Alan D. Miller. Apr 82, 62p AMMRC-TR-82-23
Contracts DAAG46-79-C-0054, EC-76-A-1017-002

The aims of this study were to observe and measure the wetting behavior of liquid yttria-alumina-silica mixtures when in contact with silicon nitride at high temperature and in an environment of one atmosphere of nitrogen. Preliminary indications suggest that over a wide range of yttrium contents, the wettability range is small and that the compositions are reactive to the substrate even though they do not wet readily. A much larger experimental data base is necessary, however, over a wider range of experimental conditions to understand the wetting characteristics and reaction behavior in this complex system. (Author)

DE82012767 MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
High-Temperature Applications of Structural Ceramics. Quarterly Progress Report, October-December 1981.
1981, 40p DOE/OR/20679-T7
Contract AI05-80OR20679
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The achievement of higher efficiency thermochemical engines and heat recovery systems requires the availability of high temperature, high performance structural materials. Structural ceramics such as SiC, Si sub 3 N sub 4 and certain Al sub 2 O sub 3 -Si sub 3 N sub 4 combinations have received particular attention for these applications due to their basic characteristics of good strengths coupled with good corrosion and thermal shock resistances. Even with these positive attributes, improved reliabilities and extended lifetimes under service conditions are necessary for structural ceramics to gain industrial acceptance and use. The problems are mechanical and/or chemical in nature. With an objective of improved performance for heat engine/heat recovery applications the NBS program on structural ceramics addresses these problems through the determination of the critical factors which influence mechanical and microstructural behavior. (ERA citation 07:044200)

N82-31531/8 PC **A08**/MF **A01**
Rockwell International, Pittsurgh, PA. Space Div.
Containerless Preparation of Advanced Optical Glasses: Experiment 77F095.
Final Report.
R. A. Happe, and K. S. Kim. 1 Mar 82, 160p NAS 1.26:162073, SSD82-0125, NASA-CR-162073
Contract NAS8-32953

Containerless processing of optical glasses was studied in preparation for space shuttle MEA flight experiments. Ground based investigation, experiment/hardware coordination activities and development of flight experiment and sample characterization plans were investigated. In the ground based investigation over 100 candidate glass materials for space processing were screened and promising compositions were identified. The system of Nb2O5-TiO2-CaO was found to be very rich with containerless glass compositions and as extensive number of the oxides combinations were tried resulting in a glass formation ternary phase diagram. The frequent occurrence of glass formation by containerless processing among the compositions for which no glass formations were previously reported indicated the possibility and an advantage of containerless processing in a terrestrial environment.

N82-31532/6 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Crystal Physics and Optical Electronics Lab.
Photovoltaic Effect in Ferroelectric Ceramics.
Final Technical Report, 1 Sep. 1980 - 31 Oct. 1981.
D. J. Epstein, A. Linz, and H. P. Jenssen. Apr 82, 62p NAS 1.26:169287, NASA-CR-169287
Contract NAG1-98

The ceramic structure was simulated in a form that is more tractable to correlation between experiment and theory. Single crystals (of barium titanate) were fabricated in a simple corrugated structure in which the pedestals of the corrugation simulated the grain while the intervening cuts could be filled with materials simulating the grain boundaries. The observed photovoltages were extremely small (100 mv).

N82-31691/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Influence of Corrosive Solutions on Microhardness and Chemistry of Magnesium Oxide /001/ Surfaces.
H. Ishigaki, K. Miyoshi, and D. H. Buckley. Aug 82, 11p NAS 1.60:2040, E-1035, NASA-TP-2040

X-ray photoelectron spectroscopy analyses and hardness experiments were conducted on cleaved magnesium oxide /001/ surfaces. The magnesium oxide bulk crystals were cleaved to specimen size along the / 001/ surface, and indentations were made on the cleaved surface in corrosive solutions containing HCl, NaOH, or HNO3 and in water without exposing the specimen to any other environment. The results indicated that chloride (such as MgCl2) and sodium films are formed on the magnesium oxide surface as a result of interactions between an HCl-containing solution and a cleaved magnesium oxide surface. The chloride films soften the magnesium oxide surface. In this case microhardness is strongly influenced by the pH value of the solution. The lower the pH, the lower the microhardness. Sodium films, which are formed on the magnesium oxide surface exposed to an NaOH containing solution, do not soften the magnesium oxide surface.

PATENT-3 785 836 Not available NTIS
National Aeronautics and Space Administration, Washington, DC.
High Modulus Invert Analog Glass Compositions Containing Beryllia.
Patent,
J. F. Bacon. Filed 21 Apr 72, patented 15 Jan 74, 6p N82-29452/1, PAT-APPL-246 295
Supersedes PAT-APPL-246 295-72.Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

Glass compositions having a Young's modulus of at least 15 million psi and a specific modulus of at least 110 million inches consisting essentially of, in mols, 10-45% SiO2, 2-15% Li2O, 3-34% BeO, 12-36% of at least one bivalent oxide selected from the group consisting of CaO, ZnO, MgO and CuO, 10-39% of at least one trivalent oxide selected from the group consisting of Al2O3, B2O3, La2O3, Y2O3 and the mixed rare earth oxides, the total number of said bivalent and trivalent oxides being at least three, and up to 10% of a tetravalent oxide selected from the group consisting of ZrO2, TiO2 and CeO2.

PATENT-3 811 901 Not available NTIS
National Aeronautics and Space Administration, Washington, DC.
Non-Toxic Invert Analog Glass Compositions of High Modulus.
Patent,
J. F. Bacon. Filed 21 Apr 72, patented 21 May 74, 5p N82-29454/7, PAT-APPL-246 294
Supersedes PAT-APPL-246 294-72.Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

Glass compositions having a Young's modulus of at least 15 million psi are described. They and a specific modulus of at least 110 million inches consist essentially of, in mols, 15 to 40% SiO2, 6 to 15% Li2O, 24 to 45% of at least two bivalent oxides selected from the group consisting of Ca, NzO, MgO and CuO; 13 to 39% of at least two trivalent oxides selected from the group consisting of Al2O3, Fe2O3, B2O3, La2O3, and Y2O3 and up to 15% of one or more tetravelent oxides selected from the group consisting of ZrO2, TiO2 and CeO2. The high modulus, low density glass compositions contain no toxic elements. The composition, glass density, Young's modulus, and specific modulus for 28 representative glasses are presented. The fiber modulus of five glasses are given.

PATENT-3 947 281 Not available NTIS
National Aeronautics and Space Administration, Washington, DC.
High Modulus Rare Earth and Beryllium Containing Silicate Glass Compositions.
Patent,
J. F. Bacon. Filed 2 Jun 72, patented 30 Mar 76, 5p N82-29455/4, PAT-APPL-259 056
Supersedes PAT-APPL-259 056-72.Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

Glass compositions having a Young's modulus of at least 16 million psi and a specific modulus of at least 110 million inches consisting essentially of approximately, by weight, 20 to 43% SiO2, 8 to 21% Al2O3, 4 to 10% BeO, 27 to 58% of at least one oxide selected from a first group consisting of Y2O3, La2O3, Nd2O3, Ce2O3, Ce2O3, and the mixed rare earth oxides, and 3 to 12% of at least one oxide selected from a second group consisting of MgO, ZrO2, ZnO and CaO are described. The molar ratio of BeO to the total content of the first group oxides is from 1.0 to 3.0.

11C. Coating, Colorants, and Finishes

AD-A119 756/5 PC **A03**/MF **A01**
Naval Air Development Center, Warminster, PA. Aircraft and Crew Systems Technology Directorate.
Shipboard Exposure Testing - USS AMERICA.
Progress rept.,
E. J. Jankowsky. 20 Aug 82, 31p Rept no. NADC-82101-60

Results of corrosion tests of various inorganic coatings on 17-4 PH and 4130 steel specimens exposed on the flight deck of an aircraft carrier are given in the report. Also described are the results of exposure on EM1 seals, water displacing paint, cadmium and aluminum coated steel fasteners in aluminum alloy plate, and boron/aluminum composite material. (Author)

AD-A119 805/0 PC **A03**/MF **A01**
Presearch, Inc., Arlington, VA.
Smooth Compliant Antifoulant Coatings.
Final rept. 4 Jun 82-30 Sep 82,
H. Dean Batha, Piero Nannelli, and Jay W. Harford. 30 Sep 82, 27p Rept no. PI-TR-577
Contract N00014-82-C-0592

Fiber reinforced composites provide a wide array of structural and acoustic properties. The composites may be isotropic or extremely anisotropic, and offer considerable flexibility for designing underwater acoustic sensor flow noise outer decouplers. Compliant layers appear to be effective in suppressing flow noise; however, effectiveness diminishes with depth, in part because of material compressibility and distortions caused by own ship's speed. Composite materials can be fabricated with high strength and modulus to maintain shape under severe loads to eliminate erratic acoustic performance caused by outer decoupler distortion. (Author)

DE82015006 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.

Use of FT-IR Reflection-Absorbance Spectroscopy to Study Photochemical Degradation of Polymeric Coatings on Mirrors.
J. D. Webb, P. Schissel, A. W. Czanderna, D. M. Smith, and A. R. Chughtai. 1981, 9p SERI/TP-255-1513, CONF-811013-24
Contract AC02-77CH00178
Electrochemical Society conference, Denver, CO, USA, 11 Oct 1981.

A technique is presented for in situ study of degradative changes in polymeric coatings on metallic substrates. The technique uses a controlled environment chamber in conjunction with a Fourier-transform infrared (FT-IR) spectrophotometer. The chamber design permits collection of IR reflection-absorbance spectra from a sample undergoing exposure to controlled ultraviolet (uv) radiation, gas mixtures, and temperatures. Initial data presented confirm the ability of the technique to provide information regarding the bulk photochemistry of bisphenol-A polycarbonate coatings on gold and aluminum substrates. Refinements of this technique should allow a detailed kinetic study of degradative reactions at the polymer/metal interface.

DE82015595 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Technique for Fabricating Thick Polyimide Coatings in the 10 to 100- mu M Range.
W. C. Herrmann. 14 May 82, 20p UCID-19396
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche only after original copies are exhausted.

A multicoating planar polyimide coating technique has been developed which covers a pre-selected thickness range between 10 and 100 mu m, over a 1 cm diameter. Excellent surface qualities plus low submicron particulate levels contribute to achieving high resolution images (2 to 3 mu m range) with the aid of photo-resist coatings and contact exposures. Reactive ion etching of polyimide maintains this resolution and produces the vertical geometry required for the fabrication step of thick Au Zone Plates.

DE82902427 MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Density of Plasma-Deposited A-Si:H Films.
S. S. Lantratova, G. Pesti, and I. K. Somogyi. 1981, 8p KFKI-1981-77
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The density of glow discharge deposited hydrogenated amorphous silicon obtained at 250 exp 0 C on high purity Al foil was measured by the density gradient method. The density of the films is 2.18 g/cm exp 3 , i.e. there is an approx. 6% density deficit compared with c-Si which, in our case, is not due to its porous structure. The density gradient method is a quick, convenient and very sensitive method for checking the quality of a-Si:H films. (ERA citation 07:047449)

PATENT-4 336 117 Not available NTIS
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Refractory Coatings and Method of Producing the Same.
Patent,
W. A. Brainard, and D. R. Wheeler. Filed 7 Dec 79, patented 22 Jun 82, 4p N82-29415/8, PAT-APPL-6-102 003
Supersedes PAT-APPL-6-102 003, N80-14232 (18 - 05, p 0583).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

The adhesion, friction, and wear properties of sputtered refractory coatings on substrates of materials that form stable nitrides is improved by placing each substrate directly below a titanium carbide target of a commercial radiofrequency diode apparatus in a vacuum chamber. Nitrogen is bled into the system through a nozzle resulting in a small partial pressure of about 0.5% to 2.5% during the first two minutes of deposition. The flow of nitrogen is then stopped, and the sputtering ambient is reduced to pure argon through a nozzle without interrupting the sputtering process. When nitrogen is deliberately introduced during the crucial interface formation, some of the titanium at the interface reacts to form titanium nitride while the metal of the substrate also forms the nitride. These two nitrides atomically mixed together in the interfacial region act to more strongly bond the growing titanium carbide coating as it forms on the substrate.

11D. Composite Materials

AD-A119 402/6 PC **A03**/MF **A01**
Naval Surface Weapons Center, Silver Spring, MD.
The Ultrasonic Detection of Unbond in Deep Layers of Multilayered Composites.
Final rept. 15 Jul 81-31 Mar 82,
Robert A. Youshaw, and Jeffrey M. Warren. 10 May 82, 30p NSWC/TR-82-236, SBI-AD-F500 071

The through transmission ultrasonic method was applied to the problem of detecting unbond in deep layers of multilayer composites. A casting containing severe internal defects was used for the base metal. A range of thickness and non-parallel surfaces were considered. Using the decibel scale, the casting was characterized on a one inch grid. From the difference between this and subsequent measurements as layers were applied, it was possible to distinguish between bond and unbond on layers well beneath the surface.

AD-A119 625/2 PC **A10**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Asymmetric Reinforcements of a Quasi-Isotropic Graphite Epoxy Plate Containing a Circular Hole.
Master's thesis,
Gary Sean O'Neill. Jun 82, 207p

The response to uniaxial loading of a graphite epoxy panel containing a one-inch diameter hole was analyzed by finite element analysis and tested experimentally. The analysis modeled the basic unreinforced panel and six different asymmetric reinforcements consisting of additional layers of the same material of circular shape on one side of the panel laminate. The reinforcement configurations varied the volume of the reinforcement from 94% to 162% of the volume of the material removed by the hole, the number of reinforcing layers (1 to 4) and the outer radius of the reinforcement layers from 0.75 inches to 1.5 inches. The orientation of the reinforcing layers was either 45 deg or 0 deg to the load direction. Results of the computational analysis indicated that the reduction of maximum strain (in the direction of the load at a point at the edge of the hole 90 deg from the load direction) by the reinforcements was at most 12%, with apparent dependence on the number of layers used and the volume of the reinforcement.

DE82015845 MF **A01**
Lawrence Livermore National Lab., CA.
Mechanical Properties of a Filament-Wound Aramid Fiber/Epoxy Composite for Flywheel Application.
H. T. Hahn, and W. K. Chin. Feb 82, 126p UCRL-15461
Contract W-7405-ENG-48
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The purpose of this program was to determine the mechanical properties of a filament-wound Kevlar 49/epoxy composite in a simulated flywheel service environment. The temperature and vacuum chosen were 75 exp 0 C and 1 Pa, respectively. Specimens were preconditioned in the test environment for periods of 1 to 5 months before mechanical tests. The simulated service environment of 75 exp 0 C in vacuum has been found to have little effect on static and fatigue properties of the composite. The excellent retention of strength by individual fibers in the same environment provides added confidence. The composite is stable for a period of two years studied so far in the 75 exp 0 C/vacuum environment. However, the moisture desorption increases residual sresses and causes ply cracking in laminates. The composite is less sensitive to the environment than the fibers and the matrix by themselves. 53 figures, 11 tables.

N82-31447/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
A Repair Technology Program at NASA on Composite Materials.
J. W. Deaton. Aug 82, 24p NAS 1.15:84505, L-15462, NASA-TM-84505

Repair techniques for graphite/epoxy and graphite/polyimide composite structures are discussed. Tension and compression test results for several basic repair processes that were applied to damaged specimens are shown to approach the strength of undamaged specimens. Other repair configurations currently under investigation are illustrated, and plans in the repair technology program are presented.

N82-31451/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Interface Control and Mechanical Property Improvements in Silicon Carbide/Titanium Composites.
W. D. Brewer, and J. Unnam. Aug 82, 22p NAS 1.60:2066, L-15381, NASA-TP-2066

Several composite systems made of titanium matrix reinforced with silicon carbide fiber were investigated to obtain a better understanding of composite-degradation mechanisms and to develop techniques to minimize loss of mechanical properties during fabrication and in service. Emphasis was on interface control by fiber or matrix coatings. X-ray diffraction studies on planar samples showed that the formation of titanium silicides was greatly inhibited by the presence of aluminum or Ti3A1 layers at the fiber-matrix interface, with the Ti3A1 being more effective in reducing the reactions. Fiber studies showed that coating the fiber with a 1-micron-thick layer of aluminum improved the as-fabricated strength of a stoichiometric SiC fiber and reduced the fiber degradation during exposure to composite-fabrication conditions. Applying an interfacial barrier by coating the matrix foils instead of the fibers was found to be an effective method for improving composite strength. Reducing the fabrication temperature also resulted in significant improvements in composite strengths. Good-quality, well-consolidated composites were fabricated at temperatures well below those currently used for SiC-Ti composite fabrication.

N82-31533/4 PC **A03**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Chemical Engineering.
Nonequilibrium Material Effects on the Behavior of Polymeric Composite Matrices and Their Related Composites.
Final Report.
G. L. Wilkes. 2 Apr 82, 37p NAS 1.26:169286, NASA-CR-169283
Contract NAG1-78

The effects of physical aging on the material properties of some linear and network macromolecular glasses are discussed. The free volume concept is used to describe this behavior. The effect of physical aging on properties of some uniaxial graphite/fiber epoxy resin composites is investigated using stress relaxation in both tensile and flexural modes. The matrix polymers used were resins both of which are based on a 4,4-methylenedianiline derivative of epichlorohydrin with diamino diphenyl sulfone (DDS) as the curing agent. The matrix resin, as used in the practical application in composites, not fully cured and the glass transition of the network was dependent on the curing schedule. The physical aging of the bulk crosslinked epoxy was found to depend on the annealing temperature, and the T sub g of the resin. The physical aging of the composite, monitored by the stress relaxation method, was found to be dependent on the testing direction.

PATENT-4 338 371 Not available NTIS
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Absorbent Product to Absorb Fluids.
Patent,
F. S. Dawn, and J. V. Correale. Filed 24 Dec 80, patented 6 Jul 82, 6p N82-29362/2, PAT-APPL-6-219 681
Supersedes PAT-APPL-6-219 681, N81-16127 (19 - 07, p 0870).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A multi-layer absorbent product for use in contact with the skin to absorb fluids is discussed. The product uti-

lizes a water pervious facing layer for contacting the skin, overlayed by a first fibrous wicking layer, the wicking layer preferably being of the one-way variety in which fluid or liquid is moved away from the facing layer. The product further includes a first container section defined by inner and outer layer of a water pervious wicking material between which is disposed a first absorbent mass. A second container section defined by inner and outer layers between which is disposed a second absorbent mass and a liquid impermeable/gas permeable layer. Spacesuit applications are discussed.

11E. Fibers and Textiles

PB83-851857 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Manufacture of Foam Backed Textiles. 1975-October, 1982 (Citations from World Textile Abstracts).
Rept. for 1975-Oct 82.
Oct 82, 136p
Supersedes PB82-857285.Prepared in cooperation with Shirley Inst., Manchester (England).

This bibliography contains citations concerning the equipment, processes, and material used in the manufacture of foam-backed textiles. The coating materials, including polyurethane and rubber, are discussed, and the equipment and processes are included. Their use as a backing for drapes and carpets is considered. (This updated bibliography contains 218 citations, 39 of which are new entries to the previous edition.)

11F. Metallurgy and Metallography

AD-A119 400/0 PC **A02**/MF **A01**
Army Armament Research and Development Command, Watervliet, NY. Large Caliber Weapon Systems Lab.
Fracture Mechanics Analysis of the Effects of Residual Stress on Fracture Life.
Final rept.,
Joseph F. Throop. Jul 82, 16p ARLCB-TR-82020, SBI-AD-E440 161

It is re-emphasized here that the effect of residual stress in fatigue is analogous to but not the same as the mean stress effect from applied loads. The inclusion of a residual stress term in the stress intensity factor range of the fatigue crack propagation rate equation permits one to use the residual stress in calculations of fatigue life estimates. Using crack shape factors calculated for given aspect ratios of surface flaws and integrating da/dN, one obtains an equation for the S-N curve which includes the residual stress effect on fatigue performance. This process of calculation reveals that compressive residual stress has a much stronger influence on fatigue life than tensile residual stress does, mainly because the former decreases the stress intensity factor range and increases the critical crack size while the latter only decreases the critical crack size. Numerical solution of an example illustrates an application of these concepts.

AD-A119 499/2 PC **A06**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
The Friction and Wear of Copper in High-Load, Low-Speed, Small-Amplitude Reciprocating Sliding.
Research and development rept. Oct 80-Jun 82,
Sidney A. Karpe. Aug 82, 107p Rept no. DTNSRDC-82/048

There is a critical need that the mechanisms of wear in marine components sliding under marginally-lubricated conditions be elucidated. These conditions were simulated in a tribotester that was operated under conditions of high nominal pressure, low speed, and small-amplitude reciprocating sliding. High purity (99.9%) copper was selected as the rubbing member because of its relatively simple microstructure and its widespread use as a base metal in many bearing alloys. The friction and wear of this metal, rubbing against various counterfaces in 'inert' mineral oil, were determined. Topographical changes and subsurface deformation structures produced by sliding were determined. The investigation produced information on the following: The influence of topographical changes on the coefficient of friction (or frictional force); The dependence of the depth of deformation on the coefficient of friction; The mechanism of wear particle formation; and The relationship between wear and the coefficient of friction. The results also suggested that the topographical changes produced by sliding may be more important than the properties of the material itself in determining wear resistance. (Author)

AD-A119 579/1 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Investigation Into the Two-Way Shape Memory Trainability of Polycrystalline Cu-Zn-Al Alloys.
Master's thesis,
Richard O. Sponholz. Jun 82, 81p

The ability of polycrystalline Cu-Zn-Al alloys to demonstrate increasing percentage two-way shape memory (TWSM) displacements with 'training' is investigated. Results indicate a definite relationship between increased cycling and increased TWSM ability. The empirical training cycle curve parameters are presented and shown to change with cycling. Most parameters show a decreasing trend. Transmission electron microscopy of trained alloys is conducted in an effort to mechanistically explain TWSM training. (Author)

AD-A119 594/0 PC **A08**/MF **A01**
Harvard Univ., Cambridge, MA. Div. of Applied Sciences.
Resistance Rise in Ultrathin Metallic Wires at Low Temperatures.
Interim rept.,
Alice E. White. Aug 82, 167p Rept no. TR-18
Contract N00014-77-C-0085, Grant NSF-DMR80-20247
Sponsored in part by Grant NSF-DMR79-04155.

The wires, which have cross-sectional dimensions as small as 220A x 200A, are fabricated using a versatile step-edge shadowing technique. The dimensions of the wires can be precisely determined by easily-controlled fabrication parameters such as thin film thickness and shadowing angle. In order to verify the dimensions and integrity of the wires, we have developed a convenient and reliable technique for thinning the substrate. This allows nondestructive examination of the structures by high resolution transmission electron microscopy. We have used a similar technique to investigate grain sizes of thin metal films. The theoretical models for the low temperatures resistance rise in samples of reduced dimensionality are usually classed as based on one-electron localization or many-electron interaction effects. Our experimental results for copper, AuPd alloy, and nickel wires accurately confirm the proportionality to T to the -1/2 predicted by the interaction model of Altshuler, Khmelnitzkii, Larkin, and Lee. Moreover, we find that our results and the results of a careful reanalysis of the data already in the published literature give an absolute magnitude consistent within a factor of approx. 2 with the quantitative predictions of this model, using independently determined parameters. We therefore infer that interaction effects are at least as important as, and may dominate over, localization effects in all one-dimensional lithographically-produced samples reported to date.

AD-A119 607/0 PC **A05**/MF **A01**
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
Statistics of Crack Growth in Engine Materials. Volume 1. Constant Amplitude Fatigue Crack Growth at Elevated Temperatures.
Interim rept. 15 Jan 81-15 Jan 82,
J. N. Yang, G. C. Salivar, and C. G. Annis, Jr. Jul 82, 93p PWA/GPD/FR-16444, AFWAL-TR-82-4040-VOL-1
Contract F33615-80-C-5189
Prepared in cooperation with George Washington Univ., Washington, DC.

Classically crack propagation analyses for engine components employed in residual life predictions are deterministically based. They typically account for materials scatter by the incorporation of a safety factor. A statistical treatment of materials scatter is necessary to permit a maximum utilization of component life. Two fracture mechanics-based statistical models for the fatigue crack growth damage accumulation in engine materials are proposed and investigated. These statistical models are based on the synergistic fracture mechanics models, i.e., hyperbolic sine crack growth rate function, developed by Pratt and Whitney. Test results of IN-100, a superalloy used in the F-100 engine, at various elevated temperatures, loading frequencies, stress ratios, etc., have been compiled and analyzed statistically. The statistical distributions of (1) the crack growth rate; (2) the propagation life to reach any given crack size; and (3) the crack size at any service life, have been derived. It is demonstrated that the correlation between the test results and two statistical models is very good. (Author)

AD-A119 672/4 Not available NTIS
Wisconsin Univ.-Madison. Dept. of Metallurgical and Mineral Engineering.
Crystallization of Undercooled Pb-Sn Alloys,
K. P. Cooper, I. E. Anderson, and J. H. Perepezko. 1981, 5p ARO-17455.2-MS
Contract DAAG29-80-K-0068
Availability: Pub. in Proceedings of the International Conference on Rapidly Quenched Metals (4th), p107-110 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 677/3 PC **A03**/MF **A01**
Army Armament Research and Development Command, Watervliet, NY. Large Caliber Weapon Systems Lab.
Recycling of Scrap Gun Tubes by Rotary Forging.
Final technical rept.,
C. Calderone. 1 Sep 82, 34p

The first step in the recycling programs was to determine tube models and available quantities for recycling. Next, a computer program was written to establish an optimum mix of new tubes which could be produced from the available models of scrap tubes. Based on the computer program, scrap tubes were brought in from the field and prepared for recycling. Prepared tubes were forged, heat treated, and tested for mechanical properties. Complete details for approach to the problem can be found in Appendix 1. (Author)

AD-A119 716/9 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY. Dept. of Materials Engineering.
Mechanisms of Fretting Fatigue Crack Initiation in Medium Strength Steels.
Final technical rept.,
D. J. Duquette. 1 Sep 82, 7p ARO-15979.4-MS
Contract DAAG29-79-C-0013

Effects of carburization and decarburization were studied on the fretting fatigue behavior of a medium carbon steel at room temperature. Tests were conducted in room air in a listing frame which was designed to vary the fretting (normal) load, and the relative displacement (slip amplitude) between the list specimens and fretting pads. Statistical studies conducted on the specimens indicated that after a threshold value of normal load, the fretting fatigue lives dropped by an order of magnitude. No significant effects of slip amplitude or fretting wear were observed on the fretting fatigue life. (Author)

DE82011015 PC **A03**/MF **A01**
Sandia National Labs., Livermore, CA.
Slow Strain-Rate Testing of Alloy 800 in Molten-Nitrate Salts.
S. H. Goods. Jan 82, 26p SAND-82-8201
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

An experimental technique has been developed to examine the interaction between deformation and the exposure of certain high temperature structural alloys to oxidizing molten salt environments. The experimental program involved performing a series of long-term tensile tests over a wide range of strain rates. Fracture strain reduction in area and ultimate strength (UTS) were monitored as parameters indicative of an alloy's susceptibility to environmental degradation. For Incoloy Alloy 800 tested at 600 exp 0 C in the salt medium and at initial strain rates between 2 x 10 exp -7 sec exp -1 and 1 x 10 exp -5 sec exp - 1 no appreciable loss of ductility, as measured by reduction in area, was observed relative to control specimens tested in air at the same temperature and strain rates. Similarly, fracture strain and UTS were essentially unaffected by exposure to the oxidizing environment. The structure of the oxide film formed by contact of the specimens to the molten salt was affected by the imposed continuous

deformation. Deformation resulted in an oxide which was thicker than that formed on undeformed salt-exposed surfaces. While this difference in oxide thickness was a measurable phenomenon, the increased rate of oxidation was not great enough to appreciably alter alloy mechanical behavior in the salt compared to that measured in air. In addition, fine subsurface cracks were observed in those oxides formed on deformed surfaces.

DE82013539 PC **A02**/MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.
Metal-Smelting Facility.
D. R. Kellogg, J. E. Mack, W. T. Thompson, and L. C. Williams. 1982, 11p CONF-820418-13
Contract W-7405-ENG-26
UCC-ND and GAT environmental protection seminar, Gatlinburg, TN, USA, 5 Apr 1982.

Currently there are 90,000 tons of contaminated ferrous and nonferrous scrap metal stored in above-ground scrap yards at the Department of Energy's Uranium Enrichment Facilities in Tennessee, Kentucky, and Ohio. This scrap is primarily contaminated with 100 to 500 ppM uranium at an average enrichment of 1 to 1.5% exp 235 U. A study was performed that evaluated smelting of the ORGDP metal in a reference facility located at Oak Ridge. The study defined the process systems and baseline requirements, evaluated alternatives to smelting, and provided capital and operating costs for the reference facility. A review of the results and recommendations of this study are presented.

DE82013634 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Automated System for Ion Beam Analysis and Temperature Ramping.
J. C. Banks. Feb 82, 30p SAND-82-0334
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

An automated system has been developed to perform ion beam analysis with in situ temperature programming from approx. 120K to approx. 770K. (ERA citation 07:047390)

DE82015513 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Hydrogen Effects in High-Purity Stainless Steels.
G. R. Caskey, Jr. 1982, 7p DP-MS-81-80, CONF-820625-2
Contract AC09-76SR00001
International congress on hydrogen and materials, Paris, France, 7 Jun 1982, Portions of document are illegible.

Internal and environmental hydrogen damage to three pure stainless steels (19% Cr and 10, 14 or 19% Ni) were evaluated by tensile tests. Concentrations of C, Mn, Si and P were less than in commercial alloys. Susceptibility of the pure alloys to hydrogen damage was comparable to that of commercial austenitic stainless steels. 3 figures, 4 tables.

DE82015730 PC **A03**/MF **A01**
Sandia National Labs., Livermore, CA.
Final Report on Low-Cycle Fatigue and Creep-Fatigue Testing of Salt-Filled Alloy 800 Specimens.
J. L. Kaae. May 82, 27p SAND-82-8182
Contract AC04-76DP00789

Uniaxial low-cycle fatigue and creep-fatigue tests have been carried out on hollow alloy 800 specimens that were either filled with air or with a molten mixture of sodium nitrate, potassium nitrate and an oxidizer. Low-cycle fatigue tests were carried out at 1200 exp 0 F and 650 exp 0 F by cycling the strain continuously between equal mangitude of tensile and compressive values at a rate of 4 x 10 exp -3 sec exp -1 until failure. The creep-fatigue tests were carried out at 1200 exp 0 F. The loading cycle differed from that of low-cycle fatigue testing only in the imposition of a hold at the peak compressive strain in each cycle. Cracks always initiated on the inner surface of the hollow specimen, and therefore, corrosive effects on crack propegation and initiation were controlled by the environment within the specimen cavity. In common with tests carried out earlier on steam-filled alloy 800 specimens, at 1200 exp 0 F in the presence of molten salt the heat of alloy 800 with the lower carbon content had a higher fatigue strength than the heat with the higher carbon content even though different heats were used in the two testing programs. The fatigue strength of the two heats of material in the presence of molten salt at 650 exp 0 F were about the same. Tests with air-filled specimens indicated that the presence of the molten salt degraded the fatigue life at 1200 exp 0 F but did not affect the creep fatigue life, while the presence of steam enhanced both the fatigue life and the creep-fatigue life.

DE82902157 MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Research Projects for Solving the Red Mud Problem in the Aluminium Industry.
G. Wargalla. Dec 80, 89p BMFT-FB-T-80-198
In German.Portions of this report are illegible.
U.S. Sales Only. Available in microfiche only.

In the production of alumina from bauxite large quantities of a moist residue - so-called red mud - are separated. Deposotion of this material represents an increasing problem. Within the scope of the sponsored project possibilities of utilization of red mud were studied. By making use of a pilot spray-drier erected for this purpose, a filler was developed from red mud and put on the market for use in bituminous road-construction and in plastics. 600.000 m exp 2 road surface with 2.500 t red mud filler have been constructed. The basic know-how for the production of lightweight aggregates from the tailings of coal dressing by addition of red mud was worked out. By recovery of valuable caustic soda from red mud a residue of low alkaline content was produced Bricks of this material can be used as prefabricated steel works slag. (ERA citation 07:044026)

N82-31523/5 PC **A03**/MF **A01**
UKAEA, Springfields (England). Nuclear Power Development Labs.
Thermal-Shock-Fatigue Study of Type 304 and 316 Stainless Steels.
D. J. Marsh. Jan 82, 26p DE82-902364, ND-R-606(S)

Thermal fatigue crack initiation and propagation promoted by thermal quenches was studied in type 316 and 304 stainless steels and correlated with isothermal strain-cycling fatigue. Axially unconstrained specimens of rectangular section were held at bulk temperatures of 250 to 5000 C and symmetrically water quenched on the narrow faces to give equivalent surface strain ranges from 2.8 x 10(+3) to 5.4 x 10(+3). Crack initiation in smooth samples showed an apparent theshold at a surface strain range of 2.8 x 10(+3), equivalent to a thermal amplitude of 1500 C, with no cracking being produced in 500,000 cycles. The crack growth in pre-notched samples was evaluated by direct observation and by subsequent fractography and showed two modes of growth. The crack growth was strain controlled during the early stages of propagation where the crack tip was within the surface zone under conditions fully plastic cyclic yield.

PB83-111906 PC**$105.00**/MF**$105.00**
Construction Industry Research and Information Association, London (England).
Painting Steelwork.
I. P. Haigh. c1982, 128p CIRIA-93, ISBN-086017-183-3
Also pub. in ISSN-0305-408X.

The principles of metallic corrosion are described and the different techniques of preparing substrates explained. Prior to painting, metallic coatings are often used, and the methods of application are outlined. Paint types and constituents are described, together with a discussion on selection of particular systems. The methods of paint application and quality/inspection testing are assessed.

PB83-852004 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Passivation of Metal: Mechanisms and Analysis. 1966-October, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Oct 82.
Oct 82, 221p
Supersedes PB82-858325.

This bibliography contains citations concerning the applications, analyses, and mechanisms of passivating films, coatings, and surface treatments of metal substrates. The study of passive films by auger electron spectroscopy, glow discharge spectroscopy, and other methods are discussed. The passivation of ferrous and nonferrous metals by electrochemical deposition, chemical coating, surface alloying and mechanical coating is included. (This updated bibliography contains 308 citations, 51 of which are new entries to the previous edition.)

PB83-852087 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Pitting Corrosion of Nickel and Nickel Base Alloys. 1966-October, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Oct 82.
Oct 82, 116p
Supersedes PB82-857608.

Factors affecting pitting corrosion of nickel and nickel base alloys are discussed in terms of exposure to chlorides in general and sea water in particular. Emphasis is placed on methods for the passivation of these alloys in high temperature applications such as gas turbines. Problems associated with stress corrosion are also included. (This updated bibliography contains 156 citations, 17 of which are new entries to the previous edition.)

PB83-852293 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Amorphous Alloys: Iron Base. 1966-October, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Oct 82.
Oct 82, 267p
Supersedes PB81-858912.

This bibliography contains citations concerning properties of amorphous alloys where iron is the major constituent. Properties include magnetic properties, electrical resistivity, corrosion resistance, structure and alloy stability. (This updated bibliography contains 296 citations, 27 of which are new entries to the previous edition.)

PB83-852350 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cavitation Corrosion and Erosion of Rotating Machinery. 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Oct 82.
Oct 82, 252p
Supersedes PB82-857343.

This bibliography contains citations concerning the effect of fluid cavitation on the erosion corrosion of moving parts. Particular emphasis is placed on cavitation generated by rotating machinery such as turbine blades and marine propellers. Included are the effects of cavitating flow on shafts and the use of protective coatings for erosion control. (This updated bibliography contains 282 citations, 18 of which are new entries to the previous edition.)

PB83-852384 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Extractive Metallurgy. 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Oct 82.
Oct 82, 221p
Supersedes PB82-859000.

The citations cover worldwide information on extractive metallurgy and its various processes. The kinetics of extractive techniques are included. Representative processes considered include fluidized bed electrode, solvent and centrifugal extraction. The extraction of copper, rare earths, precious metals, and uranium from ores is included. (This updated bibliography contains 218 citations, 16 of which are new entries to the previous edition.)

PB83-852400 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Corrosion Protection of Metals and Metal Alloys. 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Oct 82.
Oct 82, 231p
Supersedes PB82-858986.Prepared in cooperation with the Department of Energy, Washington, DC.

The corrosion protection of metals and metal alloys is discussed in these reports in terms of electrochemical concepts, which include metal passivation and cathodic protection. The use of protective coatings and corrosion inhibitors is also discussed. Emphasis is placed on high temperature corrosion in coal gasification environments, as well as molten salt systems. (This updated bibliography contains 226 citations, 62 of which are new entries to the previous edition.)

PB83-852517 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fracture Toughness. 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Oct 82.
Oct 82, 266p
Supersedes PB82-859687.

This bibliography contains citations concerning fracture toughness values and tests of aluminum, cast iron, steels, other nonferrous alloys, and adhesive bonded laminates. Drop weight, charpy-v-notch, dynamic tear, j-integral, and ultrasonic testing procedures are considered. (This updated bibliography contains 265 citations, 15 of which are new entries to the previous edition.)

PB83-852558 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Metallography: Computer Analysis. 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Oct 82.
Oct 82, 113p
Supersedes PB82-859539.

This bibliography contains citations concerning computerized simulation, modeling, and analysis applied to the study of the formation, microstructure, composition, and phases of various metals and metal alloys. There is some theoretical consideration of metallographic methods or techniques also. (This updated bibliography contains 107 citations, 12 of which are new entries to the previous edition.)

PB83-852608 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Flotation Separation of Cobalt and Titanium Particles. 1966-October, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Oct 82.
Oct 82, 101p
Supersedes PB82-859398.

This bibliography contains citations concerning flotation recovery processes for the extraction of cobalt and titanium from concentrates by causing the selected particles to float by utilizing different surface chemical properties. Ion flotation from solution of manganese ore, recovery from slags of autogenous smelting of copper-nickel concentrates, extraction from hard alloy waste, and flotation agents and reagents are among the topics considered relative to the recovery of cobalt and titanium. Evaluation of the degree of separation of particles by flotation is included with respect to determination by infrared spectroscopy. (This updated bibliography contains 149 citations, 18 of which are new entries to the previous edition.)

PB83-852616 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Flotation Separation of Gold and Silver Particles. 1966-October, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Oct 82.
Oct 82, 96p
Supersedes PB82-859406.

This bibliography contains citations concerning the recovery of gold and silver from concentrations by flotation separation which causes selected particles to float by utilizing different surface chemical properties. Testing procedures and performance evaluations of the flotation process variations of such concentratees as cyanide solutions, sulfide ores from sand and gravel operations, and residue dumps are examined. Flotation reagent developments for gold and silver recovery are included with performance evaluations. (This updated bibliography contains 134 citations, 10 of which are new entries to the previous edition.)

PB83-852624 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Zinc and Zinc Alloys as Protective Coatings. 1966-October, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Oct 82.
Oct 82, 95p
Supersedes PB82-859935.

This bibliography contains citations concerning the corrosion protection of materials by means of zinc and zinc coatings exclusive of electroplating and electrodeposition. Zinc rich paints and metallization are featured, as well as polymeric coatings and paints based on zinc. Major applications include structural steel work, oil and gas pipes, pipe joints, and offshore structures. (This updated bibliography contains 138 citations, 11 of which are new entries to the previous edition.)

11G. Miscellaneous Materials

DE82007241 PC **A03**/MF **A01**
SRI International, Menlo Park, CA.
Determination of Properties of Fluids for Solar-Cooling Applications. Literature Survey.
R. T. Podoll. Feb 81, 49p SRI-PYU-2221
Contract AC03-80CS30221

A detailed literature search of the available thermodynamic data of proposed refrigerant/absorbent pairs and measurement of those data that are unmeasured or unreliable are reported. The data to be obtained for the pure fluids included: the critical temperature, pressure and volume; the vapor pressure curve; the latent heat of vaporization at the normal boiling point; the freezing point; the specific heat of the liquid and vapor; and the specific volumes of the saturated liquids and vapors. For the fluid mixtures, the data included the dew point and bubble point at four specified pressures plus the heats of mixing and specific heat at several solution compositions. Pure fluids surveyed included: ammonia, methylamine, ethylamine, chlorodifluoromethane (R-22), fluorodichloromethane (R-21), ethylene glycol, 1,4-Butanediol, diethylene glycol dimethyl ether (DGDE), N,N-dimethylacetamide (DMA), N,N-dimethylhexanamide (DMH), N,N-dimethyldecanamide (DMD). Binary fluid mixtures surveyed included: ammonia/ethylene glycol; ammonia/1,4-butanediol; methylamine/ethylene glycol; methylamine/1,4-butanediol; ethylamine/ethylene glycol; ethylamine/1,4-butanediol; and R-22/ DGDE.

11H. Oils, Lubricants, and Hydraulic Fluids

AD-A119 621/1 PC **A03**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. Ship Performance Dept.
Finite-Element Method for Heat Transfer Problem in Hydrodynamic Lubrication.
Research and development rept.,
Kwang June Bai. Apr 82, 36p Rept no. DTNSRDC/SPD-1043-01

Galerkin's finite element method is applied to a two-dimensional heat convection-diffusion problem arising in the hydrodynamic lubrication of thrust bearing used in naval vessels. A parabolized thermal energy equation for the lubricant, and thermal diffusion equations for both bearing pad and the collar are treated together, with proper juncture conditions on the interface boundaries. It has been known that a numerical instability arises when the classical Galerkin's method, which is equivalent to a centered difference approximation, is applied to a parabolic-type partial differential equation. Probably the simplest remedy for this instability is to use a one-sided finite difference formula for the first derivative term in the finite difference method. However, in the present coupled heat convection-diffusion problem in which the governing equation is parabolized in a subdomain (lubricant), uniformly stable numerical solutions for a wide range of the Peclet number are obtained in the numerical test based on Galerkin's classical finite element method. In the present numerical computations, numerical convergency errors in several error norms are presented in the first model problem. Additional numerical results for a more realistic bearing lubricant problem are presented for a second numerical model. (Author)

AD-A119 771/4 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC.
Investigation of the Lubrication Mechanisms of the Complex Metal Sulfide, SbSbS4.
Annual rept. 1 Oct 80-30 Sep 81,
L. K. Ives, M. B. Peterson, J. S. Harris, P. A. Boyer, and A. W. Ruff. Jul 82, 77p Rept no. NBSIR-82-2545
Contract N00014-80-F-0031

Studies were carried out to determine certain basic properties of the complex metal sulfide, SbSbS4, that pertain to its use as a solid lubricant and lubricant additive material. Past research demonstrated that this material exhibited superior extreme pressure (EP) performance, antiwear properties, and high temperature stability. The present research verified the performance under EP conditions as an additive to a base grease. However, the performance of SbSbS4 as a solid lubricant (in the form of a powder) was not found to be effective at temperatures below about 225 C. It was noted though that, when used as a dry powder lubricant, the compound did produce a thick adherent film on steel surfaces in sliding contact. Six different types of wear and friction tests were carried out under various conditions of load, sliding speed, contact geometry, temperature, and time, in order to fully explore the potential of SbSbS4 as a lubricant on several different metals. In a number of cases, its performance was compared with MOS2 and with other sulfur containing additives in lubricants. Electron microscopy studies on film material removed from the sliding contact surfaces showed that the interaction of sulfur released from SbSbS4 with the steel surface, presumably at locally elevated temperatures, is a principal mechanism.

DE82902156 MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Development of a New Distillation Process for Re-Refining Waste Oil in Order to Avoid Environmental Burdens. Phase 1: Preliminary Tests in Bern.
S. Draebert, E. Rohner, F. R. Ruhkopf, and P. Schmitz. 1981, 60p BMFT-FB-T-81-034
In German.Portions of this report are illegible.
U.S. Sales Only. Available in microfiche only.

The tests in Bern have shown that the sodium process can also be used in practice; it is, however, necessary to further improve the knowledge gained so far in a larger pilot plant during a long-term trial, as well as to prove a series of details which could not be sufficiently solved under the Bern trial conditions. In detail, the Bern trials have shown the following results: The product yield is by 2 to 3% higher with the sodium process than with the sulphuric acid process. The product qualities with respect to single, essential results are better than with the sulphuric acid process. The environmental burden due to the sodium process is less than that of the sulphuric acid process. In addition, the sodium process is more economical than the sulphuric acid process according to recent findings. This knowledge led to the positive decision to continue our research project in Berlin, despite the entrepreneurial risk and the necessary capital investment. (ERA citation 07:042306)

11I. Plastics

N82-31446/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Positron Lifetime Studies in Thermoplastic Polyimide Test Specimens.
J. J. Singh, T. L. Stclair, W. H. Holt, and W. Mock, Jr.. Jul 82, 14p NAS 1.15:84532, NASA-TM-84532
Original Contains Color Illustrations.

Positron lifetime measurements were made in two thermoplastic polyimide materials recently developed at Langley. The long component lifetime values in polyimidesulfone samples are 847 + or - 81 Ps (dry) and 764 + or - 91 Ps (saturated). The corresponding values in LARC thermoplastic imides are 1080 + or - 139 Ps (dry) and 711 + or - 96 Ps (saturated). Clearly,

the presence of moisture has greater effect on positron lifetime in LARC thermoplastic imides than in the case of polyimidesulfones. This result is consistent with the photomicrographic observations made on frozen water saturated specimens of these materials.

PB83-852012 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Polyphosphazenes. December, 1973-October, 1982 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for Dec 73-Oct 82.
Oct 82, 124p
Supersedes PB82-855305.

This bibliography contains citations concerning polyphosphazene and other phosphazene polymers and copolymers. The synthesis, characterization, and physical properties are discussed, and how these factors relate to their applications are considered. Their applications in fire resistant materials, thermal and electrical insulation, and biomedical materials are considered. (This updated bibliography contains 127 citations, 28 of which are new entries to the previous edition.)

PB83-852020 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Polyphosphazenes. December, 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for Dec 73-Oct 82.
Oct 82, 104p
Supersedes PB82-855297.

This bibliography contains citations concerning polyphosphazene and other phosphazene polymers and copolymers. The physical properties, analysis and characterization, synthesis and polymerization methods are considered. The application of polyphosphazenes in fire resistant materials, and thermal and electrical insulation are discussed. (This updated bibliography contains 84 citations, 15 of which are new entries to the previous edition.)

PB83-852178 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Antioxidants and Stabilizers for Plastics. June, 1976-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 76-Oct 82.
Oct 82, 309p
Supersedes PB80-855984.

This bibliography contains citations concerning the technology of antioxidants and stabilizers utilized in plastics. Protection from ultraviolet radiation, heat, light, and the natural elements are discussed relative to the use of antioxidants and stabilizers for various major thermoplastic resins. Thermosetting resins are also mentioned. Applications include conductor insulation, dyes, and automobile parts. Utilization and applications for rubber are covered in another bibliography. (This updated bibliography contains 288 citations, 88 of which are new entries to the previous edition.)

11J. Rubbers

AD-A119 468/8 PC **A03/MF A01**
Akron Univ., OH. Inst. of Polymer Science.
Slow Decomposition of Silicone Rubber.
Technical rept.,
P. Vondracek, and A. N. Gent. Sep 82, 29p Rept no. TR-19
Contract N00014-76-C-0408

The sol content of previously-extracted samples of lightly-crosslinked silicone rubber has been found to increase during prolonged storage under relatively mild conditions. Simultaneously, the tensile stress slowly decreases in samples held stretched, and the equilibrium degree of swelling increases somewhat. Thus, the polymer network appears to undergo slow decomposition. This process is accelerated by moisture, by ammonia vapor and by raising the temperature of storage.

AD-A119 469/5 PC **A03/MF A01**
Akron Univ., OH. Inst. of Polymer Science.
Spontaneous Adhesion of Silicone Rubber.
Technical rept.,
A. N. Gent, and P. Vondracek. Sep 82, 26p Rept no. TR-18
Contract N00014-76-C-0408

Lightly-crosslinked silicone rubber has been found to bond spontaneously to polar substrates and to itself. The strength of adhesion increases linearly with time, eventually reaching the fracture strength of the rubber. The process is accelerated by raising the temperature (activation energy approx 60 kJ/g-mole), by the presence of moisture, and by ammonia vapor. It is tentatively attributed to hydrolytic decomposition of the polymer leading to the formation of reactive groups which interlink with surface groups, probably hydroxyls, on polar substrates, or with each other in the case of self-adhesion. (Author)

DE82015189 PC **A02/MF A01**
Lawrence Livermore National Lab., CA.
Synthesis and Characterization of a New Silicone Multiblock Polymer.
M. O. Riley, J. R. Kolb, and E. S. Jessop. 10 May 82, 23p UCRL-87613, CONF-820642-2
Contract W-7405-ENG-48
JOWOG-28 meeting, Kansas City, MO, USA, 10 Jun 1982.

The Lawrence Livermore National Laboratory (LLNL) has an active interest in the synthesis of new polysiloxanes as base polymers for cellular silicone materials. These elastomers have properties uniquely suited to very specific engineering requirements. While the polymers which we have prepared via random equilibrium of various cyclic tetrasiloxanes have adequate properties for certain applications, there is evidence to suggest that alternating block polysiloxanes prepared via condensation-polymerization techniques have properties more suited to our end uses as flexible foam materials (cushions). The synthetic sequence developed to prepare these materials involves reactions of functionally terminated (silylamino and silanol) polysiloxane oligomers to produce alternating multiblock (ABAB...) materials of high molecular weight. Dialkylamines are condensation byproducts in this reaction. The analysis and characterization of these multiblock polymers is reported.

N82-31534/2 PC **A14/MF A01**
Podlaseck (Stanley E.), Lompoc, CA.
Nonmetallic Materials Handbook. Volume 2: Epoxy and Silicone Materials.
Final Report.
S. E. Podlaseck. Jul 82, 308p NAS 1.26:3588, NASA-CR-3588
Contract NAS1-15133

Chemical and physical property test data obtained during qualification and receiving inspection testing of nonmetallic materials for the Viking Mars Lander program is presented. Thermochemical data showing degradation as a function of temperature from room temperature through 773 K is included. These data include activation energies for thermal degradation, rate constants, and exo- and/or endotherms. Thermal degradations carried out under vacuum include mass spectral data taken simultaneously during the decomposition. Many materials have supporting data such as condensation rates of degassed products and isothermal weight loss. Changes in mechanical, electrical, and thermal properties after exposure to 408 K in nitrogen for times ranging from 380 to 570 hours are included for many materials.

11L. Wood and Paper Products

PAT-APPL-6-326 086 PC **A02/MF A01**
Department of Agriculture, Washington, DC.
Method of Pressing Reconstituted Lignocellulosic Materials.
Patent Application,
Robert L. Geimer. Filed 30 Nov 81, 24p PB83-101485
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method of producing reconstituted wood boards in a conventional press by introducing saturated steam through apertured press platens into a partially-compressed mat, composed of lignocellulosic material and a thermosetting resin binder, under specified conditions of mat density. Use of saturated steam in this manner allows production of a reconstituted wood board with shorter total press time than usual and with a more efficient use of energy. In addition total press time can be further reduced by injecting a gaseous catalyst into the mat to speed the cure of the thermosetting resin binder.

PB83-851204 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Fillers, Extenders, and Coloring Used in Papermaking. 1976-October, 1982 (Citations from the Institute of Paper Chemistry Data Base).
Rept. for 1976-Oct 82.
Oct 82, 404p
Supersedes PB81-865628.

This bibliography contains citations concerning the production, manufacturing processes and the properties of fillers, extenders, and coloring used in papermaking. Production includes the preparation of fillers and colorants including review articles on fillers used in the processes and pollution aspects. Manufacturing processes include machine life and characteristics as a function of filler types, preparation of the pulp, and products, such as printing papers, newsprint, wallpaper, fiberboard and particleboard, coated papers, embossed papers, and corrugated paper products. Dynamic and mechanical properties of paper with fillers and colorants are addressed in many articles. The literature includes many references to patents. (This updated bibliography contains 340 citations, 53 of which are new entries to the previous edition.)

PB83-851212 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Papers Manufactured for Reprography . 1977-October, 1982 (Citations from the Institute of Paper Chemistry Data Base).
Rept. for 1977-Oct 82.
Oct 82, 343p
Supersedes PB81-867509.

This bibliography contains citations concerning the manufacturing of papers used in reprography. Reprography includes blueprinting, diazo copying, electrostatic copying, offset printing, electrophoretic printing, hectography, and electrolytic recording. The manufacturing processes include formulations for coatings and substrates, optimizing sheet properties for various printing processes, sheet feeding, and curing. Some articles reference specialty papers, used for security printing or safety paper to protect against forgery or counterfeiting. Almost all articles pertain to sheet or specialty papers, but a few are on the subject of printing on cartons or textiles. Much of the referenced literature cites patents. (This updated bibliography contains 319 citations, 138 of which are new entries to the previous edition.)

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A119 410/9 PC **A07/MF A01**
Stanford Univ., CA. Dept. of Statistics.

Sequential Stochastic Construction of Random Polygons.
Technical rept.,
Edward Ian George. 10 Jun 82, 142p Rept no. TR-320
Contract N00014-76-C-0475

Homogeneous Poisson fields of lines divide the plane into non-overlapping convex polygons. Of interest to researchers is geometrical probability have been the distributions of characteristics of the polygons induced by the distributions of the lines, especially N, the number of sides, S, the perimeter, and A, the area. A sequential stochastic process is developed from which an independent and identically distributed sample of polygons can be extracted with a stopping time. It is shown that the distribution of polygons so obtained is identical to the distribution of polygons in the Poisson field. The stochastic process is developed in full generality and can be applied to anisotropic cases as well as the case of most interest, the isotropic case. Useful families of anisotropic distributions for this problem are defined. The sequential stochastic process is used to derive general analytical expressions for polygon distributions for the investigation of the unknown distributions of N, S and A. Methods are also developed which provide the basis for very fast computer simulation of the process. A Monte Carlo study of distributions of N, S, and A in various cases is presented. In particular, a sample of 2,500,000 polygons in the isotropic case provides the most precise results to date. (Author)

AD-A119 417/4 PC **A06**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Time-Split Methods for Partial Differential Equations.
Doctoral thesis,
Randall John LeVeque. Apr 82, 104p Rept no. STAN-CS-82-904
Contract N00014-75-C-1132

This thesis concerns the use of time-split methods for the numerical solution of time-dependent partial differential equations. Frequently the differential operator splits additively into two or more pieces such that the corresponding subproblems are each easier to solve than the original equation, or are best handled by different techniques. In the time-split method the solution to the original equation is advanced by alternately solving the subproblems. In this thesis a unified approach to splitting methods is developed which simplifies their analysis. Particular emphasis is given to splittings of hyperbolic problems into subproblems with disparate wave speeds. Three main aspects of the method are considered. The first is the accuracy and efficiency of the time-split method relative to unsplit methods. The second topic is stability for split methods. The final topic is the proper specification of boundary data for the intermediate solutions, e.g., the solution obtained after solving only one of the subproblems. The main emphasis is on hyperbolic problems, and the one-dimensional shallow water equations are used as a specific example throughout. The final chapter is devoted to some other applications or the theory. Two-dimensional hyperbolic problems, convection-diffusion equations, and the Peaceman-Rachford ADI method for the heat equation are considered.

AD-A119 418/2 PC **A06**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Wave Propagation and Stability for Finite Difference Schemes.
Doctoral thesis,
Lloyd Nicholas Trefethen. May 82, 106p Rept no. STAN-CS-82-905
Contract N00014-75-C-1132

This dissertation investigates the behavior of finite difference models of linear hyperbolic partial differential equations. Whereas a hyperbolic equation is nondispersive and nondissipative, difference models are invariably dispersive, and often dissipative too. We set about analyzing them by means of existing techniques from the theory of dispersive wave propagation, making extensive use in particular of the concept of group velocity, the velocity at which energy propagates. The first three chapters present a general analysis of wave propagation in difference models. We describe systematically the effects of dispersion on numerical errors, for both smooth and parasitic waves. The reflection and transmission of waves at boundaries and interfaces are then studied at length. The key point for this is a distinction introduced here between leftgoing and rightgoing signals, which is based not on the characteristics of the original equation, but on the group velocities of the numerical model. The last three chapters examine stability for finite difference models of initial boundary value problems.

AD-A119 438/0 PC **A05**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Combinatorial Algorithms I,
Ernst W. Mayr. May 82, 84p Rept no. STAN-CS-82-907
Contract N00014-81-K-0330, Grant NSF-MCS77-23738

No abstract available.

AD-A119 471/1 PC **A02**/MF **A01**
RAND Corp., Santa Monica, CA.
The Relation Among the Likelihood Ratio-, Wald-, and Lagrange Multiplier Tests and Their Applicability to Small Samples,
Daniel F. Kohler. Apr 82, 13p Rept no. RAND/P-6756

In this paper, we show that the Lagrange multiplier test, the likelihood ratio test and the Wald test are monotonic functions of each other. This implies that they have the same power characteristics. If the critical values are specified such as to equate the probabilities of type I error, the probabilities of type II error will be equal as well, and conflicting results are impossible. The critical values of the three tests are related to each other by the same monotonic functions as the three test statistics. The 'conflicts' pointed out in the literature arise only when the exact critical values for each test are replaced by the asymptotically justified critical value of a Chi-square distributions. The extent to which this critical value differs from the exact one varies from test ot test. Determining the exact critical values for finite samples is somewhat difficult, because the exact finite sample distributions of the LM and LR test are generally not known. However, under the assumption of normality, the W test can be transformed into an F-test by applying the standard degrees of freedom correction. Futhermore, since the LR and LM tests are functionally related to the W test, they can be transformed into the same test statistic. We can thus conduct an exact finite sample test, based either on the LM, LR or W statistic without running the risk of obtaining conflicting results.

AD-A119 475/2 PC **A02**/MF **A01**
RAND Corp., Santa Monica, CA.
Conflict among Testing Procedures,
Daniel F. Kohler. Apr 82, 11p Rept no. RAND/P-6765

Savin (1976) and Berndt and Savin (1977), among others, have pointed out that an inequality relation exists between the Lagrange Multiplier Test, the Wald Test, and the Likelihood Ratio Test. However, since all tests converge to the same limiting Chi-square distribution they are usually compared against the same critical value. This raises the possibility of conflicting conclusions from the three tests. Kohler (1979) and Vandaele (1981) have shown that the three tests are monotonic functions of each other. This implies that they have identical power characteristics. In particular, if the probabilities of Type I errors are equal among the three tests, they have to have the same probability of Type II errors as well. In essence we are dealing with one and the same test. In this paper, we review briefly how the tests are related and why the inequality relation exists. We then derive criteria which allow us to determine which test is more appropriate in a given situation. This should resolve possible conflicts for at least some sets of circumstances.

AD-A119 535/3 PC **A02**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Psychology.
A Multivariate Test for Homogeneity of Regression Weights for Correlated Data.
Technical rept.,
Lawrence R. James, and Lois E. Tetrick. 15 Sep 82, 22p Rept no. GT-ONR-3
Contract N00014-80-C-0315

An analytic procedure is presented for testing the homogenity of unstandardized regression weight vectors in the condition that the regression weight vectors are correlated. The basic design involves repeated measurements on a dependent variable and a set of independent variables in each of S time periods of situations. Use of the test is illustrated in a study of cross-situational consistency versus cross-situational specificity of the correlates of perceived leader behavior. (Author)

AD-A119 609/6 PC **A03**/MF **A01**
Educational Testing Service, Princeton, NJ.
Sampling Variances and Covariances of Parameter Estimates in Item Response Theory.
Technical rept.,
Frederic M. Lord, and Marilyn S. Wingersky. Aug 82, 50p Rept no. ETS-RR-82-33-ONR
Contract N00014-80-C-0402

This paper develops a possible method for computing the asymptotic sampling variance-covariance matrix of joint maximum likelihood estimates in item response theory when both item parameters and abilities are unknown. For a set of artificial data, results are compared with empirical values; also with the variance-covariance matrices found by the usual formulas for the case where the abilities are known, or where the item parameters are known. The results are consistent with the conjecture that the new method is asymptotically correct except for errors due to grouping. (Author)

AD-A119 613/8 PC **A02**/MF **A01**
California Univ., Los Angeles. Dept. of Biomathematics.
Confidence Bounds for the Exponential Mean in Time-Truncated Life Tests.
Technical rept. 1 Sep 80-30 Nov 83,
Nancy R. Mann, R. E. Schafer, and M. C. Han. Sep 82, 15p
Contracts N00014-80-C-0684, N00014-82-K-0023

This report concerns interval estimation of the mean of an underlying exponential distribution from a time-truncated, non-replacement life test. Computer methods are developed, and lower confidence bounds are tabulated for a variety of confidence coefficients and sample sizes. (Author)

AD-A119 616/1 PC **A02**/MF **A01**
California Univ., Los Angeles. Dept. of Biomathematics.
The Mann-Grubbs Method.
Technical rept.,
Nancy R. Mann, and Frank E. Grubbs. Jul 82, 7p
Contract N00014-82-K-0023

This article was written for the Encyclopedia of Statistical Sciences, edited by Johnson and Kotz. It describes the Mann-Grubbs method of obtaining confidence bounds on system reliability for the exponential series system, for which it was originally designed, and for other models. (Author)

AD-A119 639/3 Not available NTIS
Illinois Univ. at Urbana-Champaign.
Stochastic Equations of Hyperbolic Type and a Two-Parameter Stratonovich Calculus,
Bruce Hajek. Dec 79, 14p ARO-15748.8-MA
Contract N00014-79-C-0424, Grant DAAG29-78-G-0186
Availability: Pub. in The Annals of Probability, v10 n2 p451-463 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 642/7 Not available NTIS
Illinois Univ. at Urbana-Champaign. Dept. of Electrical Engineering.
A State Estimation Algorithm for Linear Systems Driven Simultaneously by Wiener and Poisson Processes,
Samuel P. Au, Abraham H. Haddad, and H. Vincent Poor. 4 Apr 79, 12p ARO-17761.10-EL
Contract DAAG29-81-K-0062
Availability: Pub. in IEEE Transactions on Automatic Control, vAC-27 n3 p617-626 Jun 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 657/5 PC **A03**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY.
Some Modified Integrated Squared Error Procedures for Multivariate Normal Data.
Interim technical rept.,
A. S. Paulson, and C. E. Lawrence. 1 Jun 82, 44p A-2, ARO-18072.2-MA
Contract DAAG29-81-K-0110

A method of estimation for the parameters of the multivariate normal distribution based on the characteristic function (density) and its sample counterpart is given. These M-estimators are dependent on a user-specified parameter. The response of the parameter esti-

mates and observation weights to variation of this user-specified parameter allows a sensitivity analysis of the data and the model considered as a single entity. The estimators have desirable robustness properties, are easy to compute and use, are relatively efficient at the multivariate normal and are useful in identifying potential outliers and problems with the statistical assumptions or the data. The method is extended to include multivariate experimental designs with attention restricted to the two-way cross classification. Several illustrations are provided. (Author)

AD-A119 659/1 PC **A02/MF A01**
Rensselaer Polytechnic Inst., Troy, NY.
Self-Critical, and Robust, Estimates for the Parameters of the Multivariate Normal Distribution.
Interim technical rept.,
N. J. Delaney, and A. S. Paulson. 1 Jun 82, 16p A-3, ARO-18072.3-MA
Contract DAAG29-81-K-0110

This algorithm yields joint robust estimates of the location vector and the variance-covariance matrix for samples from the multivariate normal distribution. The degree of robustness depends on a single filtering parameter, c, set by the user. The algorithm provides, for each observation, an internally determined weight which may be used to identify potential outliers.

AD-A119 715/1 PC **A03/MF A01**
Rensselaer Polytechnic Inst., Troy, NY.
Self-Critical, and Robust, Procedures for the Analysis of Multivariate Normal Data.
Interim technical rept.,
A. S. Paulson, and N. J. Delaney. 1 Jun 82, 42p A-4, ARO-18072.4-MA
Contract DAAG29-81-K-0110

A procecure for performing sensitivity analysis of data vis-a-vis the multivariate error model, with or without structural variables, is proposed. It is based on an estimation procedure, a generalization of maximum likelihood, which is indexed on a user-specified value c. The sensitivity analysis proceeds in the following way: the parameters of a set of data presumed to follow a multivariate normal error model are estimated via maximum likelihood (c = 0). The parameters are next estimated for an index c1 > 0. The sensitvity in parameter estimates is noted. The parameters are next estimated for a user-specified index c2 >= c1 > 0 and the sensitivity of the parameter estimates to the change in c is again noted. This process may have one or more values of c > 0. If the parameter estimates are sensitive functions of c, the model and the data are not mutually consistent and both require further detailed study. The items of data which are most contributory to this sensitivity are identified by an examination of observational weights which are a byproduct of the analysis. If the parameters and observational weights are non-sensitive to changes in the index c, then one can generally be confident of the internal consistency of the data and the error model. Fixed values of the index c provide roubust estimation procedures for model parameters. Asymptotic relative efficiencies and influence functions are provided for fixed values of c. The results of a small Monte Carlo study suggest that the asymptotic properties of the estimators are rapidly attined. Several illustrations are given. (Author)

AD-A119 724/3 PC **A03/MF A01**
Rensselaer Polytechnic Inst., Troy, NY.
Self-Critical and Robust Procedures for the Analysis of Univariate Complete Data.
Interim technical rept.,
A. S. Paulson, M. A. Presser, and E. H. Nicklin. 1 Jun 82, 38p A-5, ARO-18072.5-MA
Contract DAAG29-81-K-0110

A statistical sensitivity analysis may be defined and performed in terms of the response of a vector of parameter estimates to variation in the way sample information is processed vis-a vis to tentative underlying model. The mode of information processing is a generalization of likelihood and is indexed on a non-statistical parameter c. The case c = 0 corresponds to maximum likelihood. If the vector of parameter estimates is stable under moderate increase of the index c from 0, the tentative model and the data are internally consistent. A general procedure for the conduct of such sensitivity analyses is given along with several illustrations. For fixed, positive values of the index, one obtains a general robust estimation procedure. (Author)

AD-A119 728/4 PC **A03/MF A01**
Rensselaer Polytechnic Inst., Troy, NY.
The Form, and Some Robustness Properties of Integrated Distance Estimators for Linear Models, Applied to Some Published Data Sets.
Interim technical rept.,
A. S. Paulson, and E. H. Nicklin. 1 Jun 82, 44p A-1, ARO-18072.1-MA
Contract DAAG29-81-K-0110

A critical procedure for use in linear models is introduced and developed in some detail. It is based on a nonlinear analogue to the usual linear least squares procedure, more specifically, in the integrated distance between characteristic functions (densities) and their sample counterparts. Location and scale parameters are estimated simultaneously. The procedure depends on a user specified parameter which may be varied to determine the sensitivety of the parameters and observational weights to such variation. A sensitivity analysis of this type is useful in isolating potential problems with the data or with the assumed model. When the procedure is employed with the user-oriented parameter held fixed, a robust procedure results. The statistical properties of this procedure are discussed in some detail. A number of illustrations, taken from the literature, are examined. (Author)

AD-A119 735/9 PC **A02/MF A01**
State Univ. of New York at Binghamton. Dept. of Mathematical Sciences.
Determining the Probability of at Least One Success in Trials Conducted on the Lighted Portion of a Star Shaped Curve Subject to a Poisson Shadowing Process.
Technical rept.,
M. Yadin, and S. Zacks. 1 Sep 82, 15p Rept no. TR-3
Contract N00014-81-K-0407

A star shaped curve, C, in the plane is subject to a Poisson shadowing process. According to this process, disks of random size appear at random locations in a region between a source of light, which is at the origin, and the curve C. These disks cast shadows on C. Trials are conducted along the lighted portion of C. Each trail requires a fixed length, l, of C. The different trials are independent and have a fixed probability, p, of success. The number of trials conducted along C is a random variable, N, which depends on the random length of the lighted portion of C. The success probability is P = 1 - (E bracket q to the N bracket), where q = 1 - p. Lower and upper bounds for P are derived. A numerical example shows cases in which these bounds could be very close. (Author)

AD-A119 739/1 PC **A02/MF A01**
University of Southern California, Marina del Rey. Information Sciences Inst.
On the Equivalence of If-Then-Else and Max-Min.
Research rept.,
Leo Marcus. Aug 82, 8p Rept no. ISI/RR-81-92
Contracts DAHC15-72-C-0308, F30602-78-C-0008

Any term of the form max(s) can be expressed as if s<t, then t else s; and the case is similar for min. In this note, we examine the converse question. We show that any term containing one variable built from linear functions and if-then-else is equivalent to a max-min expression, but this is not the case for terms containing two or more variables. (Author)

AD-A119 740/9 PC **A09/MF A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Regenerative Simulation Using Internal Controls.
Doctoral thesis,
Jan Denise Eakle-Cardinal. 1982, 196p Rept no. AFIT/CI/NR/82-53D

A new procedure is developed to exploit the asymptotic properties of appropriately defined controls in order to improve the efficiency of system performance estimators obtained from a simulation experiment . Two types of standardized variates are formulated and their joint convergence in distribution to multivariate normality is established. This result is the basis for applying multinormal regression theory to the construction of valid confidence intervals for steady-state parameters. A two-stage procedure is developed. In the first stage, standardized flow variates are applied to the denominator of the classical regenerative ratio estimator to reduce its inherent bias. In the second stage, standardized service-time variates are applied to the numerator of the new ratio to reduce the variance of the resulting double multivariate ratio estimator. A new multivariate test for normality is also developed based upon the univariate Shapiro-Wilk test. The complete variance reduction procedure is validated on an analytically tractable closed Jackson queueing system. On the basis of experimental results together with the established theoretical characteristics of the technique, guidelines are presented for the practical application of the method.

AD-A119 802/7 PC **A05/MF A01**
Stanford Univ., CA. Project Orion.
Estimating Optimal Transformations for Multiple Regression and Correlation.
Technical rept.,
Leo Breiman, and Jerome H. Friedman. Jul 82, 81p Rept no. ORION-010
Contracts N00014-82-K-0054, N00014-81-K-0340

No abstract available.

AD-A119 803/5 PC **A03/MF A01**
Stanford Univ., CA. Project Orion.
Multidimensional Additive Spline Approximation.
Technical rept.,
Jerome H. Friedman, Werner Stuetzle, and Eric Grosse. Jan 82, 30p Rept no. ORION-006
Contracts N00014-81-K-0340, DE-AC03-76SF00515
Sponsored in part by Contract DE-AT03-81-ER108-43 and Grant NSF-MCS78-17697.

No abstract available.

AD-A119 813/4 PC **A03/MF A01**
Stanford Univ., CA. Project Orion.
Projection Pursuit Density Estimation.
Technical rept.,
Jerome H. Friedman, Werner Stuetzle, and Anne Schroeder. Jul 81, 41p Rept no. ORION-002
Contract N00014-81-K-0340
Sponsored in part by Contracts DE-AC03-76SF00515 and DE-AT03-81-ER10843.

The projection pursuit methodology is applied to the multivariate density estimation problem. The resulting nonparametric procedure is often less biased than kernel and near neighbor methods and does not require the specification of a metric on the data measurement space. In addition, graphical information is produced that can be used to help gain geometric insight into the multivariate data distribution. (Author)

AD-A119 815/9 PC **A02/MF A01**
Stanford Univ., CA. Project Orion.
An Introduction to Real Time Graphical Techniques for Analyzing Multivariate Data.
Technical rept.,
Jerome H. Friedman, John Alan McDonald, and Werner Stuetzle. Mar 82, 19p Rept no. ORION-009
Contracts N00014-81-K-0340, DAAG29-82-K-0056
Sponsored in part by Contracts DE-AC03-76SF00515 and DE-AT03-81-ER10843.

Orion I is a graphics system used to study applications of computer graphics -- especially interactive motion graphics -- in statistics. Orion I is the newest of a family of 'Prim' systems, whose most striking common feature is the use of real-time motion graphics to display three-dimensional scatterplots. Orion I differs from earlier Prim systems through the use of modern and relatively inexpensive raster graphics and microprocessor technology. It also delivers more computing power to its user; Orion I can perform more sophisticated realtime computations than were possible on previous such systems. We demonstrate some of Orion I's capabilities in our film: Exploring Data with Orion I. (Author)

DE82902530 PC **A02/MF A01**
National Inst. for Metallurgy, Johannesburg (South Africa).
Five Robust Indicators of Central Value.
P. J. Ellis. 14 Aug 81, 21p NIM-2121
U.S. Sales Only.

The presence of outliers and the statistical noise that affects the data for reference materials have undersirable effects on the mean and on other indicators of the central value. Five robust indicators of the central value, which are resistant to obvious outliers and less obvious contamination (spurious data), were investigated: the dominant cluster mode, the modian, the Gastwirth median, the trimean, and the trimmed mean. The mean and the median were investigated for pur-

poses of comparison. The results confirm that the mean is very unreliable, and that the Gastwirth median and the dominant cluster mode are strong indicators of the central value. (ERA citation 07:043818)

N82-31952/6 PC **A08/MF A01**
Hochschule der Bundeswehr, Munich (Germany, F.R.).
Seminar on the Line Method and Its Applications Seminar ueber die Linienmethode und Anwendungen.
K. J. Schwenfeger. Apr 82, 164p
Text in German. Proc. Of the Fall Semester, 1981.

No abstract available.

N82-32005/2 PC **A02/MF A01**
Oxford Univ. (England). Dept. of Engineering Science.
A Unified Approach to Controllers Design for Uncertain Systems.
A. Swierniak. 1982, 12p OUEL-1406/82

A model of uncertain systems based on the concept of probabilistic metrics is presented. It may be considered as a generalization of probabilistic, fuzzy, set membership point to set or inequality descriptions of uncertainty. Instead of a basic model of input-output, form, an extended model which maps elements of an input space to elements of a proper Menger space is proposed. A method of the feedback control design is an extension of Drenick's, point to set approach and uses fixed point theorem proved for special contraction mappings. The conditions for a controller which assures the reachability of satisfactory neighborhood of the desired output are given.

N82-32006/0 PC **A02/MF A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
An Explicit Finite-Difference Scheme with Exact Conservation Properties.
J. M. Sanz-serna. Sep 81, 22p CSIR-TWISK-234

A finite-difference scheme for the numerical study of the Korteweg-deVries equation is constructed that is explicit and yet conserves exactly the energy of the computed solutions. The underlying idea can also be applied to more general equations or systems. Numerical experiments are included.

N82-32007/8 PC **A02/MF A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
An Explicit Ordinary Differential Equation Method with a Useful Stability Property.
J. M. Sanz-serna. Sep 81, 9p CSIR-TWISK-232

It is proved that, for any step-size, a modified mid-point rule generates bounded sequences when applied to a family of nonlinear problems.

N82-32011/0 PC **A02/MF A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Concerning the Decompoaition of Para-Unitary Functions into Parcels of Uniform Proof Sobre a Decomposicao das Funcoes Para-Unitarias Em Parcelas de Argumento Uniforme.
P. Tissi. Mar 82, 22p INPE-2347-NTE/181
In Portuguese; English Summary.

A general solution is presented for the problem of the sum-decomposition of a para-unitary function into parcels with a homogeneous phase. This problem is of great interest in radiating systems which split the spectrum among individual radiators, required to be fed exactly in phase. Several examples illustrate the application of the basic theorems presented.

N82-32046/6 PC **A04/MF A01**
Heimann G.m.b.H., Wiesbaden (Germany, F.R.).
Lecture on Functional Differential Equations Vorlesung ueber Funktionaldifferential-Gleichungen.
E. Fuchs. Mar 82, 55p
Text in German.

Retarded functional differential equations were treated. The problem is formulated and solved by means of stepwise integration. The existence theorem and the univocality of the solution are discussed. The continuation of the solution forward and backward, and the dependence of the solution on parameters is treated. The stability theory, i.e., the influence of small perturbations of the differential equation on the asymptotic behavior of the solution, is presented. Autonomous and nonautonomous retarded functional differential equations are presented.

N82-32047/4 PC **A03/MF A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
Robust Kriging: A Proposal.
D. M. Hawkins, and N. Cressie. Sep 81, 28p CSIR-TWISK-217

Geological data frequently retain their heavy-tailed but normal-like distributions even after attempts to transform them to normality. For such data, the usual linear kriging is invalid, while the completely general valid method of disjunctive kriging may be excessively laborious. Our proposed method capitilizes on the normal center of the distribution of the data by using linear kriging on an editing of the data given. It is little more laborious than conventional linear kriging but provides good protection against the effect of data outliers. The method is also applicable to time series analysis.

N82-32055/7 PC **A02/MF A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Solution of Second-Order Linear System by Matched Asymptotic Expansions.
M. D. Ardema. Aug 82, 20p NAS 1.15:84246, A-8938, NASA-TM-84246

Matched asymptotic expansions (MAE) are used to obtain a first order approximation to the solution of a singularly perturbed second order system. A special case is considered in which the uniform asymptotic solution obtained by MAE is shown to converge to the exact solution. Ways in which the method can be used to sole higher-order linear systems, including those which are not singularly perturbed, are also discussed.

N82-32056/5 PC **A02/MF A01**
Fondazione Ugo Bordoni, Rome (Italy).
On Some Properties of a Particular Class of Matrices.
O. Brugia, P. Filipponi, and W. Wolfowicz. Feb 82, 6p FUB-2-1982

A class of matrices that includes the double stochastic matrices class is considered, and it is shown that some of the already discussed properties may be seen as a particular case of a more general property which hold for any matrix belonging to the above mentioned class. The new matrices are the set of square matrices characterized by the fact that the sum of all terms in a row or a column is equal to a constant number which may be real or complex. A theorem proving the matrix properties is presented.

PB83-111724 PC **A03/MF A01**
Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
Het Aanpassen van Negatief Binomiale Verdelingen met het APL-Programma GRPFITNEG (Adaptation of Negative Binomial Distributions with the APL-Program GRPFITNEG),
C. J. F. ter Braak. Sep 79, 35p
Text in Dutch.

GRPFITNEG, written in APL language, calculates the maximum likelihood estimates for parameters of negative binomial distributions and tests whether these distributions have equal expectations and/or equal form parameters. The parameters are calculated iteratively, using the Newton-Raphson method. The program is not suitable for values of expectations w and parameter k when they are very high (>100).

PB83-111732 PC **A03/MF A01**
Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
Schatten van Structurele en Functionele Relaties. Op Zoek Naar Toepasingen van de Theorie (Evaluation of Structural and Functional Relationships. In Search of Applications of the Theory),
A. A. M. Jansen. Jun 81, 26p
Text in Dutch.

On the basis of a number of practical examples, it is made clear that in order to estimate a functional or structural relationship, this relationship and the matching model must first be carefully defined for the measuring errors. The set-up of the experiment and the analysis of the data must be attuned hereto. Finally, the report deals with the use of an estimated relationship for prediction purposes and the distinction which may therby be made between functional and structural relationships.

PB83-111807 PC **A03/MF A01**
Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
De Eerste Vier Momenten van een Verdeling (The First Four Moments of a Distribution),
A. Keen. Dec 79, 29p
Text in Dutch.

In statistics, it is often true that a given distribution is unknown. In that case it is often possible to calculate or estimate a number of its characteristics (such as a number of moments). By selecting a sample, from a known system of distribution, with the same moments as those of the unknown distribution, an approximation of the latter is obtained. Here, the first 4 moments are defined and the question of the extent to which they determine the distribution is considered. This is applicable, for example, in test situations where in each of the hypotheses a number of moments of the distribution of a test quantity are given, but where it is not possible to calculate the distribution. A normal distribution has a special significance in statistics. Numerous procedures are based on the assumption that the relevant sample function is a function of quantities with normal distributions, whereby estimates of the first 2 moments are sufficient. It then becomes important to check whether this assumption is justified, that is to say whether a distribution (with adequate approximation) is normal. To this effect, estimates of the 3rd and 4th moments of a distribution are used whenever they are available. Formulas for estimating the first 4 moments in non-structured random samples of an infinite population, reliability intervals, and the testing for normality are discussed.

12B. Operations Research

AD-A119 809/2 PC **A03/MF A01**
Decision Science Consortium, Inc., Falls Church, VA.
How Accurate are Real World Forecasts and Estimates.
Technical rept.,
Robert C. Bromage. Sep 82, 30p Rept no. TR-82-6
Contract N00014-81-C-0330

Modern forecasting and estimation techniques provide not only point estimates of unknown variables, but also associated intervals which reflect the expected accuracy of those estimates. Often different real world forecasts, produce conflicting estimates and associated intervals of accuracy. This paper addresses the issue of how to make sure of such estimates. It is argued that to both Classical and Bayesian statisticians the problem is essentially trivial. However, it is demonstrated that the assumptions required for a formal Bayesian approach are so sensitive to small changes, that the Bayesian approach has dubious advantages over simple intuition. With the Classical attitude being unhelpful in practice, it is argued that techniques should be developed which combine formal Bayesian updating procedures with intuition. Two possible techniques are explored. The first uses Bayesian updating with parameterized likelihood functions. With suitable interpretation of the parameters, decision makers can use their intuition to choose appropriate parameters. The second technique allows for a number of alternate likelihood functions, combined probabilistically according to the decision maker's judgment. (Author)

N82-32012/8 PC **A10/MF A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Heuristic Techniques Applied to Problem Solving Tecnicas Heuriticas Aplicadas a Resolucao de Problemas.
M.S. Thesis - 1981.
J. L. Deoliveira. Feb 82, 201p INPE-2314-TDL/077
In Portuguese; English Summary.

An application of search techniques, assisted by specific knowledge of the problem domain (heuristic search) to situations where the analysis of all alternatives is impossible or not feasible is discussed. The selected search technique, the Alfa-beta pruning, generally used in implementing board games, is applied to a discrete version of differential games. A relative value V(x1, w) was defined for the proposed locally optimum

game. It was possible to establish a limit for the difference between the value of the game, as defined by them, and V(x1, w). A limit was also established for the difference between states reached after the same number of decisions in two games started at the same point. As an initial application, a game of Hawaiian checkers (KONANE) was implemented. The performance of the Alfa-beta technique was studied and verified in the applications.

13.

MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A119 525/4 PC A03/MF A01
Naval Facilities Engineering Command, Alexandria, VA.
Airfield Lighting. Design Manual 23.1.
Final rept.
Jul 81, 42p Rept no. NAVFAC-DM-23.1

Design criteria for presented for Category Code 136 and are intended for use by experienced architects and engineers. The contents include approach lighting, runway lighting, taxiway lighting; and helipad lightings. (Author)

AD-A119 582/5 PC A04/MF A01
Naval Postgraduate School, Monterey, CA.
An Experimental Apparatus to Study Enhanced Condensation Heat Transfer of Steam on Horizontal Tubes.
Master's thesis,
Raymond Lynn Krohn. Jun 82, 55p

In an effort to explore the possibility of building compact naval steam condensers, an experimental apparatus was designed and constructed to study enhanced condensation heat transfer of steam on horizontal tubes. Special care was taken to ensure a leak-tight apparatus so that the non-condensable gas content of the steam can be kept to a few parts-per-million. The boiler and steam piping is made of glass and stainless steel with rubber gaskets. Copper is used for the condensing tubes. The completed system has been tested satisfactorily at full power. (Author)

AD-A119 673/2 PC A07/MF A01
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Optimal Control of Residential Heating and Cooling Systems.
Doctoral thesis,
Robert C. Winn. 1982, 126p Rept no. AFIT/CI/NR-82-54D

In recent years, several heating and cooling systems have come into use for the purpose of reducing energy costs. Unfortunately, due to limitations of the conventional control strategies, the use of these systems does not always result in significantly reduced costs of operation. The purpose of this study is to develop control strategies for these systems which will ensure that their use results in the desired savings in energy costs. The methods of dynamic optimization are used to develop the improved control strategies for three types of systems. The system types which are analyzed are a passive solar home with an electrically heated thermal storage floor, solar and/or off-peak storage heating and cooling systems, and an active solar energy of the analyzed systems. Simulation results are presented for each system. In addition, experimental results from an implementation of the optimal collection of solar energy are presented. (Author)

DE82007220 MF A01
Bates Container, Inc., Fort Worth, TX.
Bates Solar Industrial Process Steam Application Environmental Impact Assessment.
30 Jun 81, 36p BDM/A-80-025-TR
Contract FC03-79CS30312
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

It is planned to install 34,440 square feet of linear parabolic trough solar collectors at a new corrugator plant for making corrugated boxes. The system is to operate in parallel with a fossil fuel boiler. An assessment is presented of the impacts of the solar energy system on the existing environment and to determine whether or not a more detailed environmental impact statement is needed. The environmental assessment is based on actual operational data obtained on the collector, fluid, and heat transport system. A description of the design of the solar energy system and its application is given. Also included is a discussion of the location of the new plant in Fort Worth, Texas, and of the surrounding environment. Environmental impacts are discussed in detail, and alternatives to the solar industrial process steam retrofit application are offered. It is concluded that the overall benefits from the solar industrial process heat system outweigh any negative environmental factors. Benefits include reduced fossil fuel demand, with attending reductions in air pollutants. The selection of a stable heat transfer fluid with low toxicity and biodegradable qualities minimizes environmental damage due to fluid spills, personal exposure, and degradation byproducts. The collector is found to be aesthetically attractive with minimal hazards due to glare. (ERA citation 07:049534)

DE82006272 PC A03/MF A01
Hittman Associates, Inc., Columbia, MD.
Experimental Testing of Control Strategies for Solar-Cooling Systems.
H. M. Curran. Feb 81, 28p H-C-1007/010-81-999
Contract AC03-79CS30202

Environmental control of a building is considered with respect to: the structural shell, HVAC distribution system, HVAC energy conversion equipment, HVAC control systems, and human factors. Modeling and computer simulation of solar HVAC systems is briefly discussed along with experimental testing by two methods--experimental operation of a solar HVAC system with a simulated collector, and experimental operation of a complete system under real weather and load conditions. Prior experimental test projects are discussed briefly and tabulated. Finally, a test program is recommended that consists of: development of a complete computer simulation model, development of control strategies to be tested, development of computer simulation sub-routines for control strategies, testing of control strategies by computer simulation, experimental testing, and data analysis. Each of these tasks is described individually.

DE82008386 MF A01
Department of Energy, Washington, DC. Energy Information Administration.
Survey of Large Combustors. Report on Alternative-Fuel Burning Capabilities of Large Boilers in 1979.
12 Feb 82, 26p DOE/EIA-0304
Available in microfiche only.

Data are summarized from a survey of 6647 large industrial boilers which were actually in operation during 1979. These boilers consumed a total of 4433.4 trillion Btu of purchased and nonpurchased fuels. Of this amount, 1382.5 trillion Btu or 31% was natural gas. Consumption of fuel oil, coal, pulping liquor, and waste gases was considerably smaller, ranging from 536.7 trillion Btu to 786.3 trillion Btu. Alternative-fuel burning capabilities were reported for 4598 of these boilers (70%); these consumed a total of 3461.8 trillion Btu of fuel. Most of these boilers (3683) had the capability of burning natural gas as one of the alternative fuels. The most common alternative-fuel burning capability was natural gas and fuel oil (2256 boilers). The second most common was natural gas, fuel oil, and one or more other fuels not including coal (685 boilers). There is widespread capability to burn either natural gas or fuel oil in the respondents' reported boilers. (ERA citation 07:044049)

DE82008531 MF A01
Eureka Labs., Inc., Sacramento, CA.
Thermally-Induced Ventilation in Atria: An Atrium Classification Scheme and Promising Test Sites.
Jun 81, 40p DOE/SF/11511-T5-Dr
Contract AC03-80SF11511
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

In establishing the atrium classification scheme, specific attention was given to: climate (hot-arid, warm-humid, and temperate), atrium configuration (open, closed, and adjustable tops), and thermal mechanism (natural convection, radiative cooling, shading, and others). Application of the resulting three-dimensional (three-coordinate) matrix was considered and tested. Although the testing was for purposes of checking scheme application, the procedure indicated that most of the atria examined were of the adjustable-top configuration with daylighting the principal functional mode. However, it was noted that thermally-induced air flow was present in many of the atria classified. In the identification of promising test sites it was noted that there appears to be a shortage of buildings which meet the atrium definition. Consequently, prospective test sites were categorized as follows based upon anticipated value to the study: commercial atria already constructed, commercial atria planned or under construction, and residential atria already constructed.

DE82008541 MF A01
Energy Materials Research Co., Berkeley, CA.
Selective Emitter. Task II Topical Report for Radiative-Cooling Materials.
20 Sep 81, 15p DOE/SF/11504-T2
Contract FC03-80SF11504
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The theoretical basis of the selective emitter is that, if a material emits only in the 8-13 micron interval, it will absorb only in the same interval. After a survey of several candidate materials, the silicon oxynitride system was found to have better optical properties than previously used materials as well as economic feasibility, and efforts to acquire a sample are described. Other promising materials are described: polyvinylidene fluoride (Tedlar), silicon monoxide, silicon dioxide, and silicon nitride.

DE82009397 PC A07/MF A01
Solar Energy Research Inst., Golden, CO.
Geographic Market Suitability Analysis for Low- and Intermediate-Temperature Solar IPH Systems.
A. K. Turner, J. C. Weber, and M. DeAngelis. Dec 81, 126p SERI/TR-733-1194-V.1
Contract AC02-77CH00178
Microfiche only after original copies are exhausted.

Previous studies of the industrial market for solar energy systems have considered the level of solar radiation as the main determinant of geographic markets in the US. This study evaluates geographical markets extensively based on such criteria as output of different types of low- and intermediate-temperature solar thermal collectors, air quality constraints for competitive fuels, state solar tax incentives, fuel costs, low industrial use of coal, high industrial growth areas, and industry energy consumption in different parts of the US. Market suitability analysis and mapping techniques, refined in the past 20 years by land use planners, were used to evaluate geographical markets. A computer-aided system, Generalized Map Analysis Planning System (GMAPS), performed interactive, cellular, computer mapping, and composite mapping. Results indicate that the US Southwest and West are the most attractive geographical markets for solar IPH, based on an equal weighting of the evaluation criteria. The West North-Central and East South-Central regions appear to have the least attractive markets. Specific areas within states where solar IPH systems have distinct marketing advantages also are apparent from the composite maps. However, when different weights are assigned to the various criteria, the results change significantly for some regions of the country, such as the New England, Mid-Atlantic, and West South-Central 2 regions. The results of this work will become less valid in the future as state incentives for solar IPH, air quality regulations, and the status of competitive fuels all change. Volume I contains study results and maps. (ERA citation 07:042999)

DE82009599 PC A19/MF A01
Purdue Univ., Lafayette, IN. Heat Transfer Lab.
Bi-Radiant Oven: A Low-Energy Oven System. Volume III. Application and Transfer of the Technology.
Mar 82, 440p ORNL/Sub-80-0082-V.3
Contract W-7405-ENG-26
Portions of document are illegible.
Microfiche only after original copies are exhausted.

A separate abstract was prepared for each of the three task reports of Volume III. (ERA citation 07:047204)

DE82009842 PC A05/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Cost and Performance Goal Methodology for Active Solar-Cooling Systems.
M. L. Warren, and M. Wahlig. Feb 82, 83p LBL-12753
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Economic and thermal performance analyses of typical residential and commercial active solar cooling systems are used to determine cost goals for systems to be installed between the years 1986 and 2000. Market studies indicate a relationship between market penetration (percent of market captured) and payback period for heating, ventilating, and air conditioning systems. Using reasonable values for fuel escalation and inflation rates, the payback period is related to the expected real return on investment. Postulating commercial introduction of solar cooling systems in 1986 with the market share increasing to 20% by the year 2000, payback and return on investment goals for cooling systems as a function of year of purchase are established. Using the results of systems analysis of representative 3 ton solar residential cooling/heating systems and 25 ton commercial solar cooling systems for four different cities (Ft. Worth, Phoenix, Miami, and Washington, DC), the return on investment goals are used to calculate the 20 year present value of energy savings of the solar energy systems. To be cost-effective, the incremental solar system cost must be equal to or less than the present value of the energy savings. This establishes the link between incremental solar system cost and the return on investment goal and determines the system cost goals as a function of year of purchase. In turn, the cost goals are broken down to the subsystem level. Methods for achieving these cost goals over time, based on projected solar cooling system and subsystem costs, are explored in detail. (ERA citation 07:046165)

DE82010319 MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Cost and Performance Goals for Commercial Active Solar Absorption Cooling Systems.
M. L. Warren, and M. Wahlig. Dec 81, 7p LBL-13050, CONF-820410-6
Contract W-7405-ENG-48
ASME solar energy conference, Albuquerque, NM, USA, 26 Apr 1982. Portions of document are illegible.
Available in microfiche only.

Economic and thermal performance analysis is used to determine cost goals for typical commercial active solar cooling systems to be installed between the years 1986 and 2000. Market penetration for heating, ventilating, and air conditioning systems depends on payback period, which is related to the expected return on investment. Postulating a market share for solar cooling systems increasing to 20% by the year 2000, payback and return on investment goals as a function of year of purchase are established. The incremental solar system cost goal must be equal to or less than the 20 year present value of future energy savings, based on thermal performance analysis, at the desired return on investment. The methodology is applied to determine the allowable incremental solar system cost for commercial-scale, 25 ton absorption cooling systems based on the thermal performance predicted by recent simulation analysis. Methods for achieving these cost goals and expected solar cooling system costs will be discussed. (ERA citation 07:042982)

DE82010909 PC A08/MF A01
Thompson, Hancock, Witte and Associates, Inc., Atlanta, GA.
Passive Retrofit Handbook: Solar Applications for Residences.
1980, 157p DOE/CS/30166-T1
Contract AC02-79CS30166
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The Handbook covers the following subjects: retrofit, passive solar, the passive solar window, the passive solar wall, the passive solar space, and materials and resources. Detailed construction drawings are included. (ERA citation 07:048334)

DE82011174 MF A01
Energy Materials Research Co., Berkeley, CA.
Development of Switchable Hygroscopic Materials. Final Technical Report FY 1980-1981.
1981, 61p DOE/SF/11506-T1
Contract FC03-80SF11506
Portions of document are illegible.
Available in microfiche only.

The following are covered: current considerations in desiccant dehumidification materials, switchable desiccant theory, candidate materials, test methods, test results, product design considerations, and future research. (ERA citation 07:050752)

DE82011696 PC A06/MF A01
Sandia National Labs., Albuquerque, NM.
Solar-Collector-Materials Exposure to the IPH Site Environment. Volume 1. Final Report.
V. L. Morris. Jan 82, 109p SAND-81-7026/1
Contract AC04-76DP00789
Portions of document are illegible.
Microfiche only after original copies are exhausted.

In-situ environmental exposure tests were conducted at nine proposed intermediate-temperature Industrial Process Heat (IPH) sites. Three types of reflector materials were evaluated for survivability at the nine sites: second-surface silvered glass, aluminized acrylic FEK-244 film on aluminumsubstrate and Alzak (electropolished aluminum) on aluminium substrate. Black chrome absorber material and low-iron float glass were evaluated for thermal, photochemical, and environmental degradation. The reflector specimens were monitored for decreases in specular and hemispherical reflectance due to soil buildup. The absorber material was evaluated for changes in solar absorptivity and emissivity, and the float glass was monitored for changes in transmissivity. Surface and subsurface defects on all materials were examined microscopically and, where deemed of note, were documented photographically. (ERA citation 07:046374)

DE82012572 PC A06/MF A01
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Photovoltaic/Thermal Collector Development Program. Final Report.
S. D. Hendrie. Mar 82, 115p DOE/ET/20279-168
Contract AC02-76ET20279
Portions of document are illegible.
Microfiche only after original copies are exhausted.

During the time period from 1978 to 1981, the development of combined photovoltaic/thermal (PV/T) collectors was pursued. Collector development began with the testing of commercially produced air and liquid PV/T prototype units and culminated in a second generation of collector units. Both air-and liquid-type collectors were developed as part of the second-generation effort. A number of novel concept designs, including a two-phase flow and an unglazed PV/T unit, were also studied. The results of early collector testing and the design of the second-generation units are detailed. Performance results for second-generation units are included. (ERA citation 07:042778)

DE82013252 PC A03/MF A01
Oak Ridge National Lab., TN.
Coal-Fired Boiler Costs for Industrial Applications.
S. C. Kurzius, and R. W. Barnes. Apr 82, 30p ORNL/CON-87
Contract W-7405-ENG-26
Portions of document are illegible.

Several of the current sources of information provide data on coal-fired steam boiler costs. As published, these data give widely varying and possibly inconsistent conclusions. This study was undertaken to determine the extent to which the differences in the various sets of published data bases could be resolved and, if possible, to arrive at more reliable cost correlations to be used in Oak Ridge Energy Demand Models. Our principal finding is that it is indeed possible to restate the costs within each data base on a more consistent basis. When this is done, reasonable engineering correlations of all the cost data versus steam plant capacity can be made over the 10,000 to 5000,000 lb/hr range. (ERA citation 07:046604)

DE82013416 PC A04/MF A01
Mid-American Solar Energy Complex, Minneapolis, MN.
Alternatives for Reducing Hot-Water Bills.
G. E. Bennington, and P. C. Spewak. Jun 81, 61p MASEC-SCR-81-092
Contract AC02-79CS30150

A two stage approach to reducing residential water heating bills is described. In Stage I, simple conservation measures were included to reduce the daily hot water energy consumption and the energy losses from the water tank. Once these savings are achieved, Stage II considers more costly options for further reducing the water heating bill. Four alternatives are considered in Stage II: gas water heaters; solar water heaters (two types); heat pump water heaters; and heat recovery from a heat pump or air conditioner. To account for variations within the MASEC region, information on water heating in Rapid City, Minneapolis, Chicago, Detroit, and Kansas City is presented in detail. Information on geography, major population centers, fuel prices, climate, and state solar incentives is covered. (ERA citation 07:042986)

DE82013417 MF A01
Mid-American Solar Energy Complex, Minneapolis, MN.
Summary of Some Feasibility Studies for Site-Specific Solar Industrial Process Heat.
1981, 67p MASEC-R-81-010
Contract AC02-79CS30150
Portions of document are illegible.
Available in microfiche only.

Some feasibility studies for several different site specific solar industrial process heat applications are summarized. The followng applications are examined. Leather Tanning; Concrete Production: Lumber and Paper Processing; Milk Processing; Molding, Curing or Drying; Automobile Manufacture; and Food Processing and Preparation. For each application, site and process data, system design, and performance and cost estimates are summarized. (ERA citation 07:043022)

DE82013436 PC A02/MF A01
Oak Ridge National Lab., TN.
Combined Heat and Mass Transfer in Absorption Processes.
G. Grossman. 1982, 4p CONF-820452-1
Contract W-7405-ENG-26
International workshop on absorption working fluids R and D, Berlin, F.R. Germany, 14 Apr 1982.

The approach to theoretical analysis of the combined heat and mass transfer process taking place in absorption systems is described. The two tranfer phenomena are strongly coupled here. The purpose of the analysis is to relate, quantitatively, the heat and mass transfer coefficients to the physical properties of the working fluids and to the geometry of the system. The preferred configuration is that of a falling film of liquid on a metallic surface which serves to transfer heat from the absorbent in contact with the vapor of the absorbate. The model developed may be solved for laminar, turbulent, or transition flow regimes. The results of the solution describe the development of the thermal and concentration boundary layers and the variation of the temperatures, concentrations, and heat and mass fluxes. These quantities in their normalized, dimensionless form depend on two characteristic parameters of the system: the Lewis number Le and the dimensionless heat of absorption lambda. The length in the direction of flow is normalized with respect to the Peclet number and the film thickness. Heat and mass transfer coefficients for the system were calculated. The Sherwood number for mass transfer from the vapor-liquid interface to the bulk of the film reaches a constant value of 3.63 with fully developed boundary layers for both the adiabatic and constant temperature wall. The Nusselt number for heat transfer from the interface to the bulk reaches under the same conditions values of 3.63 and 2.67 for the adiabatic and constant temperature wall, respectively. The Nusselt number for heat tranfer from the bulk to the wall reaches 1.60. (ERA citation 07:044400)

DE82013499 MF A01
Mid-American Solar Energy Complex, Minneapolis, MN.

Residential Wood Combustion Safety Workshop.
1981, 78p MASEC-CF-81-060/2
Contract AC02-79CS30150
Best available copy from document source. Available in microfiche only.

The following are discussed: the Mid-American Solar Energy Complex (MASEC); wood energy overview; wood combustion; sizing of wood combustion units; sizing and choosing a chimney; chimney connectors; installation of woodstove heating system; installation of central wood heating system; operation and maintenance; building codes; building codes, equipment testing standards, government labeling, and NFPA clearances; and homeowner insurance.

DE82013503 MF **A01**
Mid-American Solar Energy Complex, Minneapolis, MN.
Workbook on: Passive Solar Design and Energy Efficient Construction.
May 81, 359p MASEC-R-81-020/2
Contract AC02-79CS30150
Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

After a discussion of the need for energy education, the MASEC Solar 80 program is described, which is aimed at the commercialization of the design and construction of solar efficient residential buildings. Processes of heat loss and heat gain in buildings are described as background for passive solar design. Then fundamentals of energy efficient construction and of passive solar design are presented. Procedures are given for calculating design heat loads, solar contribution, and auxiliary heating requirement. Means are also described of passive solar cooling. Site selection, analysis and landscaping and interior design for passive solar homes are covered. Financial considerations and passive solar marketing and development are covered.

DE82014914 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Methanol-Based Heat Pump for Solar Heating, Cooling, and Storage. Phase III. Final Report.
P. O'D Offenhartz, T. V. Rye, R. E. Malsberger, and D. Schwartz. Mar 81, 56p BNL-51500
Contract AC02-76CH00016
Microfiche only after original copies are exhausted.

The reaction of CH sub 3 OH vapor with solid (pellet) CaCl sub 2 to form the solid phase compound CaCl sub 2 . 2CH sub 3 OH can be used as the basis of a combined solar heat pump/thermal energy storage system. Such a system is capable of storing heat indefinitely at ambient temperature, and can be used for space and domestic hot water heating, and for air conditioning with forced air (dry) heat rejection. It combines all features required of a residential or commercial space conditioning system except for solar collection. A detailed thermal analysis shows that the coefficient of performance for heating is greater than 1.5, and for cooling, greater than 0.5. This has been confirmed by direct experimental measurement on an engineering development test unit (EDTU). The experimental rate of CH sub 3 OH absorption is a strong function of the absorber-evaporator temperature difference. The minimum practical hourly rate, 0.10 moles CH sub 3 OH per mole CaCl sub 2 , was observed with the salt-bed heat transfer fluid at 40 exp 0 C and the CH sub 3 OH evaporator at -15 exp 0 C. a detailed performance and economic analysis was carried out for a system operated in Washington, DC. With 25 square meters of evacuated tube solar collectors, the CaCl sub 2 -CH sub 3 OH chemical heat pump should be capable of meeting over 90% of the cooling load, 80% of the heating load, and 70% of the domestic hot water load with nonpurchased energy in a typical well-insulated single family residence, thus saving about $600 per year. In small-scale production, the installed cost of the system, including solar collectors and backup, is estimated to be about $10,000 greater than a conventional heating and cooling system, and a much lower cost should be possible in the longer term.

DE82015100 PC **A02**/MF **A01**
Oregon Inst. of Tech., Klamath Falls. Geo-Heat Utilization Center.
Aquifer Thermal-Energy Storage for a Medford, Oregon, Planned Unit Development.
Dec 80, 10p DOE/ET/27256-T24
Contract FG06-79ET27256

A large (950 unit) Planned Unit Development (PUD) is designed for passive solar heating, including a designed roof overhang to allow incoming winter sunlight, and block the sun's summer rays. Additionally, the developers wanted to maximize the use of renewable energy, and they had begun to explore various alternatives, including the use of the available heat in groundwater. Water-to-air heat pumps can utilize ground water as low in temperature as 50 exp 0 F (10 exp 0 C); however, the lower the temperature, the greater the flow of water must be. It was found that an adequate supply of water for this use was not available.

DE82016090 PC **A04**/MF **A01**
Automation Industries, Inc., Silver Spring, MD. Vitro Labs. Div.
Solar Energy System Performance Evaluation, Forest City Dillon, Washington, DC, January 1981 Through December 1981.
P. A. Pakkala. 1981, 75p SOLAR/1041-82/14
Contract AC01-79CS30027
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The Forest City Dillon solar energy system is the Fort Lincoln Senior Village apartment complex in Washington, DC. The active solar energy system is designed to supply 59% of the hot water, and consists of 2592 square feet of flat plate collectors, 3200-gallon storage tank, and an auxiliary oil-fired boiler. Performance data are given for each month of 1981 for the system overall and for the collector, storage and hot water subsystems. The solar fraction was 28%, far short of the expected 59%. Solar energy saved 3218 gallons of fuel oil at the expense of 4986 kWh of electricity for an overall saving of $3870.00. Other data given include the solar savings ratio, system performance factor, solar system coefficient of performance, auxiliary energy and operating energy used, weather data, system operation sequence, and typical array and storage temperatures. The site and the performance evaluation techniques and equations are described.

DE82900658 MF **A01**
Renewable Energy, Electric Heating Etc. In Heat Supply Planning. Supplement to 3. Report from the Heat Plan Committee of the Ministry of Energy.
Apr 80, 1p NP-2900658
In Danish.Portions of document are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Separate abstracts are prepared for 12 chapters.

DE82900691 MF **A01**
Swedish Council for Building Research, Stockholm.
Results from the Test of Two Subsoil Heat Pumps.
O. Groendalen, and M. Renntun. 1980, 50p BFR-R-135-1980
In Swedish.Portions of this report are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The repo * describes the experience of the installation of two heat pumps at respectively Esloev and Rydsgaard, Sweden. The heat pumps used the subsurface heat by means of 400 m tube at the depth of 1.5 m. The coefficient of performance was between 2.5 and 2.6 which means a saving by 60-62%. The temperature of the soil was not affected negatively. (ERA citation 07:043925)

DE82900754 MF **A01**
Swedish Council for Building Research, Stockholm.
Heat Pumps in Housing.
1980, 151p BFR-G-26-1980, CONF-8004183-
French-Swedish conference on heat pumps in housing, Paris, France, 28 Apr 1980, Portions of this report are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The conference was organized in cooperation between Swedish and French research organizations. The aim was to discuss the latest research and application of heat pumps in housing. Various heat sources e.g. solar heat, earth heat and water were touched upon and pilot plants were described. The industrial commitments in residential heating in France were presented as well as the Swedish projects of heat storage. It was agreed upon that the development of heat pumps in industry and for home heating appears to become one of the major aspects of energy conservation. (ERA citation 07:042940)

DE82900757 MF **A01**
Swedish Council for Building Research, Stockholm.
Use of the Earth-Crust as Heat Source for Heat Pumps in Urban Areas. General Technical-Economical Estimates.
T. Berntsson, P. Aa. Franck, L. Jacobson, B. Modin, and P. Wilen. 1980, 47p BFR-R-149-1980
In Swedish.Portions of this report are illegible.
U.S. Sales Only. Available in microfiche only.

The possibility of using the earth crust as heat source or heat storage is discussed. The use of the heat pump is the condition precedent for the distribution of heat. The lowest investment cost is obtained for large plants with low storage temperatures. It is estimated that a heating system for a buliding volume equivalent to 1 million apartments could be provided for at a cost of 0.25 to 5.00 SEK per saved kWh and year. (ERA citation 07:043926)

DE82900788 MF **A01**
Swedish Council for Building Research, Stockholm.
Fieldtesting of Water-Based Heating Systems with Heat Pumps and Radiators or Convectors.
E. Bjoerk, and S. Wiklund. 1980, 71p BFR-R-131-1980
In Swedish.Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

Eight one-family houses equipped with 1 kW electric air-to-water heat pumps and electric hot water heaters were compared to eight houses of identical type, but using direct working electric radiators. The consumption of electricity and the functioning of the heat pumps were continuously recorded for more than a years time. Additional measurements of temperature and possible quality differences in the insulation of the houses etc. were made to ensure compatibility between the two groups. The houses with heat-pumps consumed in average 800 kWh more electric energy/year than the houses with resistor heating. The surprising result is due to the heat losses of the hot water heating system and the heat pump and its connections, and to the slowness of the water-based system which does not allow optimum utilization of the solar radiation. (ERA citation 07:043924)

DE82902079 PC **A10**/MF **A01**
Applied Energy Systems, Inc., Cocoa Beach, FL.
Load Leveling on Industrial Refrigeration Systems. Final Report.
H. S. Bierenbaum, and A. D. Kraus. Jan 82, 203p EPRI-EM-2208

This project addressed the problem of developing, validating, and demonstrating an optimized methodology for maximizing the benefits of load levelling, energy conservation through efficiency improvements, and reject heat recovery on large, energy intensive industrial compressor systems. A typical industrial food processing plant, a brewery, with a 2000 horsepower compressor/refrigeration system was used as a model facility and as a site for demonstration and validation of strategies developed. The approach used in this work was to construct a computer model of the facility and its energy systems and validate the model against actual data. The next step was to simulate the various conservation and load management options using the validated model. Finally, the savings available for implementing the most promising options were verified by trials in the brewery. Results showed that an optimized methodology for implementing load leveling and energy conservation consisted of first adjusting (or tuning) refrigeration systems controller variables - gain and reset - to minimize unnecessary compressor starts. Second, the primary refrigeration system operating parameters, compressor suction pressure, and discharge pressure are carefully controlled (modulated) to satisfy product quality constraints (as well as in-process material cooling rates and temperature levels) and simultaneously improve energy efficiency and peak demand. (ERA citation 07:054291)

DE82902315 PC **A04**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).

Study on Possible Applications and Efficiencies of Heat Recovery Systems in Sound-Proof Window Ventilation Devices.
H. D. Gruschka, and H. G. Gebhardt. 1981, 65p
BMFT-FB-T-81-086
In German.Portions of document are illegible.
U.S. Sales Only.

The research and development project has been terminated in July 1979 according to schedule. The different heat exchangers were tested using sound-proof window ventilation systems within the two-chamber test room. Tests were conducted for various operating conditions in order to determine the efficiency of heat recovery. Parameters were air volume flow and temperature of the outside air down to -22 exp 0 C. The room temperature was held nearly constant at 15 exp 0 C to 20 exp 0 C. For the systems tested, considerable differences in heat recovery were measured. Best results were obtained with the recuperative heat exchanger. With a closed loop circuit of liquid heat transport medium the necessary driving mechanism requires some mechanical effort resulting in higher costs. The fine-type heat exchanger is the mechanically most simple system. The measured heat recovery was 50%. Tests with the regenerative heat exchanger with a solid rotary exchanger were not successful and the system is not further considered as possible solution this application. Good results have been obtained with the push-pull capillary fan. Separation of heat exchange mechanism and flow-mixing, however, is not possible. The investigations resulted in the development of a new heat exchanger which is expected to permit higher rates of heat recovery. An extension of the research and development work for this system is being considered. (ERA citation 07:043930)

DE82902592 MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Coal-Fired Boilers.
K. A. Duijves. Jun 81, 116p ESC-11
In Dutch.Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

This report discusses various types of coal-fired boilers such as stoker-fired, pulverized-fired and fluidized-bed boilers. The state-of-the-art is described and of the different boilers comparisons are made with respect to capacity, investment costs, required coal quality, operational characteristics, steam costs and environmental impacts. In addition, air pollution control equipment, such as filters and flue-gas desulfurization systems, are discussed. The financial and technical feasibility of retrofitting existing gas and oil-fired boilers for coal-firing or for the use of coal/oil mixtures is evaluated. Main conclusions are that: (1) in the case of obligatory flue-gas desulfurization, the fluidized-bed boiler will be the preferable choice especially for the smaller units, although reliability on a commercial scale remains to be demonstrated; and (2) investment in retrofitting existing gas- and oil-fired boilers is not justified, in most cases. (ERA citation 07:046599)

N82-31571/4 PC **A10**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Lab. for Refrigerating Engineering and Air Conditioning.
Absorption Refrigeration Machines.
Ph.D. Thesis.
C. Keizer. Apr 82, 225p WTHD-144

The performance of liquid ammonia absorption machines operating under marginal conditions, e.g., powered by solar or waste heat, was assessed. Computerized simulation shows that single-stage machines perform better than two-stage machines. Experimental comparison of vertical tubular bubble absorbers and film absorbers shows that the heat transfer coefficient of the former can exceed that the latter by a factor of two or more. Bubble absorbers can be two times smaller than film ones. Bubble absorbers enable operation nearer to equilibrium conditions than film absorbers. Absorber height should be limited to 1m.

N82-31821/3 PC **A05**/MF **A01**
Eidgenoessisches Flugzeugwerk, Emmen (Switzerland).
Development of a Reverse-Rankine Cycle Heat Pump for Space Use: Design and Testing of the Engineering Model of the Vapor Compressor.
Final Report.
F. Berner, H. Oesch, and K. Goetz. Sep 81, 80p
F+W-FO-1568, ESA-CR(P)-1590
Contract ESA-4094/79/NL-AK(SC)

An installation for testing a vapor compressor under operating conditions in a heat pump loop, and the testing of the vapor compressor in this installation are described. The installation is a closed freon 12 loop, like that of a reverse Rankine cycle heat pump. It is demonstrated that the compressor operates satisfactorily under the most extreme conditions, including ingestion of liquid refrigerant during high speed operation, and operation of the compressor in different attitudes. It is shown that volumetric efficiency and isentropic compression efficiency are practically dependent on the compression ratio only, and are rather high for this size of compressor. A heat pump incorporating the vapor compressor cools payloads down to -40C. Maximum cooling rate is over 400W when payload temperature is 10C. Compressor power consumption never exceeds 120W.

PB83-114553 PC **A09**/MF **A01**
Radian Corp., Durham, NC.
Application of LIMB to Pulverized Coal Boilers - A Systems Analysis: Limestone Feed and Boiler Systems.
Interim rept. Jun 81-May 82,
Charles W. Arnold, and Richard C. Burt. Sep 82, 176p EPA-600/7-82-059
Contract EPA-68-02-3171

The report gives results of a systems analysis of the application of Limestone Injection Multistaged Burner (LIMB) technology to pulverized-coal boilers. It evaluates alternative limestone handling, preparation, and injection methods and boiler system impacts associated with LIMB applications. LIMB simultaneously reduces sulfur oxides (SOx) and nitrogen oxides (NOx) emissions from pulverized-coal boilers. It is based on using low-NOx combustion techniques combined with dry limestone injection into the furnace for simultaneous SOx control. The major aim of the study was to evaluate alternative concepts for application of the technology assess potential system problems related to its application, and identify engineering solutions to those problems. Further goals were to identify information needs related to technology application and recommend evaluations to acquire this information. Conceivably, all new boilers could be designed to handle any foreseeable impacts associated with LIMB; however, the practicality of LIMB as a retrofit technology depends on its compatibility with existing boiler systems. Sufficient information is not yet available to accurately gauge its applicability as a retrofit technology; however, this study identified potential system impacts, situations where the impacts will likely be minimized, and design or operating procedures for dealing with them.

PB83-851733 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Air Filtration and Purification. 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Oct 82.
Oct 82, 183p
Supersedes PB82-858978.Prepared in cooperation with the Department of Energy, Washington, DC.

The storage of toxic solvents and the control of dust by means of ventilation and filtration systems are discussed. Emphasis is placed on dust control in mining operations and the prevention of dust explosions. Sampling techniques for accurate measurement of suspended particulates are also included. (This updated bibliography contains 165 citations, 49 of which are new entries to the previous edition.)

PB83-852392 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Heat Exchangers For Space Heating. 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Oct 82.
Oct 82, 199p
Supersedes PB82-856998.Prepared in cooperation with the Department of Energy, Washington, DC.

Citations in this bibliography cover various heat exchange methods and types of apparatus found in heating systems for the space heating of buildings. Topics include design, development, testing, demonstration, and performance of the heat exchangers and heating systems containing them. Some attention is given to installation techniques. (This updated bibliography contains 205 citations, 42 of which are new entries to the previous edition.)

13B. Civil Engineering

AD-A119 464/6 PC **A07**/MF **A01**
Sport Fishing Inst., Washington, DC.
Evaluation of Planning for Fish and Wildlife at Corps of Engineers Reservoirs, Eufaula Reservoir Project, Oklahoma.
Interim rept.
Sep 82, 129p
Contract DACW31-79-C-0005

Eufaula Dam is located in eastern Oklahoma at river mile 27 on the Canadian River approximately 19 km (12 mi) east of Eufaula and 50 km (31 mi) south of Muskogee, Oklahoma. Eufaula Lake, the largest body of water in Oklahoma, extends into McIntosh, Haskell, Pittsburg and Okmulgee countries, Oklahoma. Construction of the dam was initiated in December, 1956, and final closure was made for flood control in February, 1964. At full power pool, Eufaula Lake inundates 41,360 ha (102,200 ac) extending upstream from the dam on the Candian River and three tributary streams (North Canadian River, Deep Fork River and Gaines Creek). A total of 74,167 ha (183,264 ac) were acquired for the project. Project lands acquired above the power pool total some 20,715 ha (51,187 ac) extending in a narrow band around the highly convoluted 965 km (600 mi) lake shoreline. Much of the vicinity of the lake is devoted to agriculture, particularly livestock production, or has been subdivided for home sites for year-round or seasonal occupancy.

AD-A119 465/3 PC **A08**/MF **A01**
Sport Fishing Inst., Washington, DC.
Evaluation of Planning for Fish and Wildlife at Corps of Engineers Reservoirs, Allegheny Reservoir Project, Pennsylvania.
Interim rept.
Sep 82, 164p
Contract DACW31-79-C-0005

Fish and wildlife resource related aspects of the Allegheny Lake project, which is located on the Allegheny River in northwestern Pennsylvania and southwestern New York, were initially described in an August, 1958 Fish and Wildlife Service (FWS) report. Information presented in this detailed FWS report was used extensively to document the subsequently issued May 9, 1961 FWS final letter report and May 9, 1961 FWS substantiating report.

AD-A119 466/1 PC **A04**/MF **A01**
Geological Survey, Austin, TX. Water Resources Div.
Techniques for Estimating the Magnitude and Frequency of Floods in the Dallas-Fort Worth Metropolitan Area, Texas.
Final rept.,
Larry F. Land, Elmer E. Schroeder, and B. B. Hampton. May 82, 67p Rept nos. USGS/WRI-82-18, USGS/WRD/WRI/82-067

Equations for predicting the magnitude and frequency of floods in the Dallas-Fort Worth metropolitan area were developed from recorded data of streams with drainage areas ranging in size from 1.25 to 66.4 square miles. The U.S. Geological Survey urban rainfall-runoff model was used to generate long-term flood-discharge records for gaged systems in the area. Simulated and recorded annual-peak data were subjected independently to log Pearson Type III frequency analyses. The results were weighted to determine appropriate discharges for 2-, 5-, 10-, 25-, 50-, and 100-year recurrence intervals. These T-year values were then used as the dependent variables in a multiple-regression analysis. The independent variables determined to be statistically significant and retained in the resulting equations were drainage area and an urbanization index that expresses the degree of urban development. Analysis of the results shows that a land-use change from rural to fully urbanized was accompanied by a 180-percent increase in discharge of a flood with a 5-year recurrence interval and about 100-percent in-

crease in discharge of a flood with a 100-year recurrence interval. (Author)

AD-A119 476/0 PC **A05/MF A01**
Marine Resource Management, Inc., Cambridge, MA.
Field Experiences with Floating Breakwaters in the Eastern United States.
Miscellaneous rept.,
Andrew V. Baird, and Neil W. Ross. Jul 82, 94p
CERC-MR-82-4
Contract DACW72-80-M-0626

In the past 10 years, the use of floating breakwaters as temporary coastal structures has become increasingly widespread in the United States as an inexpensive means for suppressing waves. However, as with any new technology, there have been many failures and a substantial number of imaginative, successful innovations. One of the chief problems contributing to the failure rate has been a lack of awareness by designers of reliable, up-to-date technical information. As part of a large research effort to remedy this problem, a survey was conducted on field experience with floating breakwaters in the Eastern United States. Results of the survey confirmed that state-of-the-art technical literature is not being properly disseminated. Structures built according to early design manuals were shown to have failed before the completion of their design life. Conversely, floating breakwaters built to the standards set by recent research have fared well and show promise of meeting their design goias. The weakest areas of the present technology are flotation and the anchoring systems. It is recommended that a concentrated research effort be directed toward these problem areas; it is also recommended that the monitoring of state-of-the-art projects continue. (Author)

AD-A119 478/6 PC **A04/MF A01**
Corps of Engineers, St. Paul, MN. St. Paul District.
Upper Minnesota River Subbasins Study (Public Law 87-639). Stage 1. Report Alternatives.
Jan 80, 75p
See also AD-A119 415.

The Study area includes the Yellow Bank, Lac qui Parle, Yellow Medicine, Redwood and Cottonwood Rivers drainage areas, all tributaries to the Minnesota River. This report is a review of problems and needs identification and focuses on alternative solutions. A primary feasibility report and environmental assessment will complete stage II. Problems include flooding, erosion and sedimentation, water quality, fish and wildlife habitat, and water use and supply. Alternatives are included for land treatment, channel alternatives, public purchase of floodplain lands, foodplain evacuation and enforcement, flood proofing, restoration of wetlands, and storage reservoirs. (Author)

AD-A119 480/2 PC **A10/MF A01**
Corps of Engineers, St. Paul, MN. St. Paul District.
Minnesota River at Chaska, Minnesota. Main Report.
Draft supplement.
Apr 82, 215p
Report on Phase I General Design Memorandum to the Final Environmental Impact Statement for Flood Control and Related Purposes. See also AD-A119 481.

This report and draft supplement to the environmental impact statement update the feasibility report for the Minnesota River at Chaska, Minnesota dated August 1973. The selected plan would protect existing improvements and reduce flood damage by about 88%. Five acres of trees near the levee and nine acres of trees and brush in the diversion area would need to be cleared, but tree plantings would partially offset this. The East Creek bypass is aligned to avoid affecting the 230-acre bench wetland. Features of related plans, such as a recreational trail system, would be included.

AD-A119 481/0 PC **A09/MF A01**
Corps of Engineers, St. Paul, MN. St. Paul District.
Minnesota River at Chaska, Minnesota. Technical Appendices.
Draft supplement.
Apr 82, 786p
Report on Phase I General Design Memorandum to the Final Environmental Impact Statement for Flood Control and Related Purpoees. See also AD-A119 480.

This report and appendices to the environmental impact statement update the feasibility report for the Minnesota River at Chaska, Minnesota dated August, 1973. The selected plan would protect existing improvements and reduce flood damage by about 88%. Five acres of trees near the levee and nine acres of trees and brush in the diversion area would need to be cleared, but tree plantings would partially offset this. The East Creek bypass is aligned to avoid affecting the 230-acre bench wetland. Features of related plans, such as a recreational trail system, would be included. (Author)

AD-A119 482/8 PC **A09/MF A01**
Corps of Engineers, St. Paul, MN. St. Paul District.
General Design Memorandum. Phase I and Environmental Impact Statement for Flood Control and Related Purposes, Sheyenne River, North Dakota.
Review draft.
Jan 82, 176p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The selected plan would consist of a levee and diversion at West Fargo/ Riverside; diversion from West Fargo to Horace; a 5-foot raise of Baldhill Dam. Fish rearing ponds and a hatchery building downstream of the dam would have to be replaced. About 140 acres of woodland and 125 acres of grassland would be required to compensate for the Dead Colt Creek tributary dam. Final mitigation requirements would be the responsibility of other agencies. (Author)

AD-A119 527/0 PC **A07/MF A01**
Naval Facilities Engineering Command, Alexandria, VA.
General Criteria for Waterfront Construction. Design Manual 25.6.
Final design criteria.
Jul 81, 126p Rept no. NAVFAC-DM-25.6

Basic criteria for the design of the elements used in waterfront construction is presented for use by experienced engineers. The contents cover general requirements concerning piling, deck, and substructure framing, and hardware for waterfront structures, as well as specific criteria for various types of installations. A section on the strength evaluation of existing waterfront structures and a section on the deterioration of waterfront structures also are included. (Author)

AD-A119 530/4 PC **A04/MF A01**
Naval Facilities Engineering Command, Alexandria, VA.
Seawalls, Bulkheads and Quaywalls. Design Manual 25.4.
Final design criteria.
Jul 81, 75p Rept no. NAVFAC-DM-25.4

Basic criteria for the design of seawalls, bulkheads, and quaywalls is presented for use by experienced engineers. The contents cover general topics including selection factors, as well as detailed design considerations for various types of seawalls, bulkheads, and quaywalls. A discussion of special considerations is included. (Author)

AD-A119 531/2 PC **A06/MF A01**
Naval Facilities Engineering Command, Alexandria, VA.
Harbors.
Final rept.
Jul 81, 118p Rept no. NAVFAC-DM-26.1

Design criteria for experienced engineers are presented for harbors, particularly with respect to requirements for military harbors of various types to be used by naval vessels. The contents include general planning criteria, functional layout, data sources, water-area elements of harbors (channels, entrances, turning, berthing, and anchorage basins), and aids to navigation. (Author)

AD-A119 550/2 PC **A04/MF A01**
Naval Facilities Engineering Command, Alexandria, VA.
Coastal Sedimentation and Dredging. Design Manual 26.3.
Final design criteria.
Dec 81, 69p Rept no. NAVFAC-DM-26.3
Supersedes Chapter 3 and portions of Chapters 1 and 2 of Rept. no. NAVFAC-DM-26 dated Dec 66.

Design and planning guidelines are presented for the layout of harbors where coastal and estuarine sedimentation are factors. Section 1 is an introduction. Section 2 includes basic principles of sedimentation, harbor silting, and shore protection. Section 3 gives planning considerations for dredging works and discusses general dredge types. (Author)

AD-A119 618/7 PC **A05/MF A01**
Naval Postgraduate School, Monterey, CA.
An Analysis of a Puff Dispersion Model for a Coastal Region.
Master's thesis,
Stephen K. Rinard. Jun 82, 89p

The Risoe National Laboratory, Roskilde, Denmark, atmospheric puff dispersion model has been tested for an atmospheric-marine environment. This three-dimensional model simulates the relates of Gaussian pollutant puffs and predicts their concentration as they are diffused and advected downwind by a horizontally homogeneous, time-dependent wind. Atmospheric characteristics such as turbulence intensity, potential temperature gradient, buoyant heat flux, and maximum mixing depth have been considered. Model predicted pollutant concentrations have been compared to airborne sampled observations. The effect of coastal turbulence not observed by the single point meteorological measurements made onboard ship greatly affects the advection and diffusion of a plume as it moves onshore. Additional measurements/predictions particular to the coastal area will have to be incorporated into the model for it to accurately predict the onshore movement of pollutants. (Author)

AD-A119 678/1 PC **A04/MF A01**
Naval Facilities Engineering Command, Alexandria, VA.
Design Criteria Used in Contracts for Public Works.
Aug 82, 70p Rept no. NAVFAC-P-34
Supersedes AD-A115 589 and all prior issues.

Construction and maintenance of Public Works of the Navy are among the major responsibilities of the Naval Facilities Engineering Command (NAVFACENGCOM). The accomplishment of the NAVFACENGCOM mission includes the use of many specifications and standards. This publication presents a current listing of NAVFACENGCOM Guide Specifications and the Federal, Military, and Special Specifications and Standards referenced in those guide specifications. However, the Federal, Military and Special Specifications referenced in Design Manuals and related P-Publications promulgated by NAVFACENGCOM as design criteria are not listed in this publication.

AD-A119 681/5 PC **A04/MF A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Optimizing Deicing Chemical Application Rates,
L. David Minsk. Aug 82, 63p Rept no. CRREL-82-18

Snow and ice control on highways has come to rely heavily on the use of sodium chloride to maintain a trafficable surface for unimpeded movement. Empirical approaches have led to a wide range of application rates, some clearly excessive, but justified on the ground of safety and expediency. The combination of environmental degradation from the huge quantities of salt entering the environment, along with the increased cost of salt itself and the cost of its application have spurred the search for more precise knowledge of the proper amount of salt to apply to a pavement, considering a range of environmental, traffic and chemical parameters. Since controlled tests in the field are extremely difficult to make, a circular test track of three test pavements, dense-graded asphaltic concrete (DGA), open-graded asphaltic concrete (DGA) and portland cement concrete (PCC), was constructed in a coldroom, Natural snow and ice were applied to the pavements and an instrumented slipping wheel was driven over the surfaces to generate frictional forces. These forces were measured and then used to evaluate the response to salt application with time for three test temperatures. OGA had the lowest friction values at a temperature near the freezing point, but higher initial values or more rapidly increasing values than DGA and PCC following salt application at the two lower temperatures. Optimum application rate of salt on PCC and DGA lies between 100 and 300 lb/lane mile(LM), and a higher rate resulted in slight or no improvement in friction. DGA showed anomalous results: lower friction for 300 lb/LM and higher friction for both 100 and 500 lb/LM. (Author)

AD-A119 696/3 MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Structures Lab.
Condition Survey of Cedars Lock and Dam, Lower Fox River, Wisconsin.
Final rept.,
Richard L. Stowe, and Joyce C. Ahlvin. Jun 82, 128p WES/MP/SL-82-4, CTIAC-52
Availability: Microfiche copies only.

The field investigation included drilling for core samples of concrete, foundation rock, and backfill. Selected specimens of these materials were tested in the laboratory for certain physical and mechanical properties. Results of the field investigation and laboratory tests indicated that the concrete in the lock and dam is locally cracked and lightly deteriorated but structurally sound. Rock masonry in the lock appears sound even though the outside surface is weathered. Cycles of freezing and thawing have caused the deterioration. The lock and dam is founded on competent bedrock. No soft or otherwise weak zones were detected in the bedrock. Soundings should be made to detect any scouring behind the dam. It is suggested that the reinforcing steel in the tainter gate piers, adjacent to the hinge pins, be examined for corrosion. (Author)

AD-A119 761/5 PC **A02**/MF **A01**
Army Medical Bioengineering Research and Development Lab., Fort Detrick, MD.
Technical Issues Raised during Risk Assessment - Case Studies.
David H. Rosenblatt, and Robert J. Kainz. 1982, 6p
Pub. in Proceedings of the National Conference on Environmental Engineering, ASCE, Minneapolis, Minnesota, 14-16 Jul 82.

No abstract available.

AD-A119 780/5 PC **A04**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Coatings and Cathodic Protection of Piling in Seawater: Results of 10-Year Exposure at Lacosta Island, Florida.
Final rept.,
J. Bukowski, and A. Kumar. Aug 82, 70p Rept no. CERL-TR-M-321

The objective of this study was to assess the rate of corrosion of bare steel with and without cathodic protection, and the effectiveness of various commercially available coating systems in preventing corrosion of steel piles in seawater. Included were 25 coatings and four sacrificial anode cathodic protection systems. Twenty-nine (two piles per set) American Society for Testing and Materials (ASTM) A36 or ASTM 690 steel H-piles were exposed for 10 years. Most of the piles were coated or had cathodic protection. In 1981, the piles were pulled out and inspected visually. Performance ratings were then established for the following coatings: organic, metal-filled, organic over metal-filled, metallic, organic over metallic, and organic with cathodic protection. Based on this study, the following conclusions were drawn: (1) The corrosion rates-determined by flange thickness measurements in the immersion zone-were 7 and 6 mils (0.18 and 0.15 mm) per year respectively for bare carbon (A36) and mariner (690) steel. Sacrificial zinc or aluminum anodes effectively reduced the corrosion in the immersed zone to less than 0.1 mil (0.003 mm) per year. (Adding sacrificial anodes to a coated steel piling also protects steel in the immersed zone if the coating is damaged). (2) A polyester glass flake coating (System 29) was the top performer. Epoxies over zinc-rich primers (Systems 20, 10, and 18) and vinyl-sealed, flame-sprayed aluminum and zinc (Systems 14 and 16) coatings performed very well after 10-years' exposure. (Author)

AD-A119 787/0 PC **A02**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
The National Pollutant Discharge Elimination System (NPDES) Permit Management System: Pilot System Description.
Final rept.,
M. Messenger, V. Scarpetta, C. Corbin, J. Bandy, and E. Smith. Aug 82, 22p Rept no. CERL-TR-N-133

The Clean Water Act of 1977 and Army Regulation 200-1 require Army installations to control the quality of their point-source wastewater effluents. Point-source discharges are controlled by National Pollutant Discharge Elimination System (NPDES) permits; each wastewater point discharging into a navigable waterway is regulated either by a Federal or State NPDES permit. The Department of the Army has been issued hundreds of NPDES permits. The report describes a pilot NPDES Permit Management System developed by the U.S. Army Construction Engineering Research Laboratory (CERL). This program allows the Army to retrieve from a central data base a permanent, continually updated inventory of the Army's wastewater effluent discharge self-monitoring information and associated NPDES permit data. This system also lets the Army aggregate, manipulate, and analyze the data base information. This report gives a brief background of the pilot system's development, suggests how the system can be used to help manage the Army's pollution abatement program, and gives detailed user instructions. (Author)

DE82005091 MF **A01**
Federal Energy Regulatory Commission, Washington, DC. Office of Pipeline and Producer Regulation.
Final Environmental Impact Statement: Rocky Mountain Pipeline Project.
Dec 81, 658p FERC/EIS-0024-FINAL
Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

This Environmental Impact Statement (EIS) presents facts pertaining to the construction, operation, and maintenance of the Rocky Mountain Pipeline Project and any alternatives or variations to this proposed action and analyzes environmental impacts which they would cause. It provides pertinent information in sufficient detail for the public to understand the project and for the decisionmaker to make a knowledgeable decision. The EIS has been prepared according to the requirements of the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality's regulations for implementing NEPA, effective July 30, 1979. In addition to the six chapters in the EIS, there are appendices containing additional material and separate technical reports which support the EIS. (ERA citation 07:048113)

DE82008056 MF **A01**
Aerospace Corp., El Segundo, CA. Environment and Energy Conservation Div.
Preliminary Assessment of Waste Oil Re-Refining.
1976, 50p DOE/ER/71013-T2
Contract AT03-76ER71013
Portions of this report are illegible.
Best available copy from document source. Available in microfiche only.

An overview of the potential for waste oil recycling is presented in outline form. Main headings are: assessment of waste oil re-refining; work plan; comparison of the Berc and 2 commercial projects; sources of waste oils; disposal of waste oil; physical and chemical analyses; process energy requirements; production capacity; and economics. Process diagrams are included for the acid clay process, vacuum distillation, propane extraction process, and hydrotreating process.

DE82008492 PC **A08**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
MAP3S Precipitation Chemistry Network: Fourth Periodic Summary Report (1980).
Dec 81, 171p PNL-4144
Contract AC06-76RL01830
Portions of this report are illegible.
Microfiche only after original copies are exhausted.

This, the fourth in a series of summary reports, contains complete field and chemical data from the MAP3S/RAINE (Multistate Atmospheric Power Production Pollution Studies) Precipitation Chemistry Network for the year 1980. The 1980 data were added to the previous data base, and an update of the previous statistical summary completed. Included are basic statistics, time trend analyses, and monthly averages. (ERA citation 07:051462)

DE82010265 MF **A01**
Tennessee Valley Authority, Chattanooga. Div. of Energy Demonstrations and Technology.
Shawnee Test Program. TVA Shawnee Test Facility. Technical Progress Report for Period May 6, 1981-May 31, 1981.
6 Jan 82, 75p DOE/FE/15034-T4
Contract AI01-81FE15034
Best available copy from document source. Available in microfiche only.

Progress accomplished during the quarter ending May, 1981 is reported. Results of the sodium thiosulfate additive tests at the Shawnee Test Facility are presented. Results indicate that sodium thiosulfate actively prevents and removes gypsum scale in the train 100 spray tower system. The optimum concentration for such action was not established. Analytical procedures were developed for thiosulfate determination in liquids. Test Facility maintenance procedures are outlined. Routine mass loading, particle size distribution, SO sub 2 , SO sub 3 and O sub 2 determinations were also performed. Daily summary data monitoring graphs are included. (ERA citation 07:049084)

DE82011012 PC **A11**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Environmental Assessment of the HYGAS Process. Volume IV. Interim Report on HYGAS Environmental Characterization: HYGAS Tests 65 Through 76.
L. J. Anastasia, R. J. Evans, S. J. Bossart, R. H. Karst, and C. S. Juan. Feb 82, 241p DOE/ET/10261-T5, FE-2433-27
Contract AC01-76ET10261
Portions of document are illegible.
Microfiche only after original copies are exhausted.

HYGAS pilot plant streams have been systematically sampled and analyzed to determine the fate of potential pollutants generated during coal gasification. This report discusses data acquisition and interpretation for pilot plant tests using a washed Illinois No. 6 bituminous coal from Peabody Mine 10. The pilot plant units of interest include the pretreater and gasifier reactors, which are considered scalable to larger HYGAS coal gasification plants. The fates of the following environmentally significant coal constituents were studied during pretreatment: sulfur compounds; nitrogen compounds; trace elements; and hydrocarbons. The following streams were sampled and analyzed: coal feeds; pretreated chars; overhead fines; tars and oils; quenched waters; and quenched off-gas. (ERA citation 07:052565)

DE82012301 MF **A01**
Houston Natural Gas, New York.
River Plant: Coal to Methanol Feasibility Study. Environmental Report.
1981, 468p DOE/RA/50337-1159-V.2-ENVIRON
Contract FG01-80RA50337
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Site studies are given: air quality, noise, geology, soils, land use, transportation facilities, water quality, terrestrial ecology and socio-economic factors, etc. (ERA citation 07:042129)

DE82012692 PC **A04**/MF **A01**
Raytheon Co., Wayland, MA.
Environmental Monitoring Report United States Department of Energy, Oak Ridge Facilities.
May 82, 66p Y/UB-16
Contract W-7405-ENG-26
Microfiche only after original copies are exhausted.

The Environmental Monitoring Program for the Oak Ridge area includes sampling and analysis of air, water from surface streams, creek sediments, biota, and soil for both radioactive and nonradioactive materials. This report presents a summary of the results of the program for calendar year 1981. Surveillance of radioactivity in the Oak Ridge environs indicates that atmospheric concentrations of radioactivity were not significantly different from other areas in East Tennessee. Concentrations of radioactivity in the Clinch River and in fish collected from the river were less than 2% of the permissible concentration and intake guides for individuals in the offsite environment. While some radioactivity was released to the environment from plant operations, the concentrations in all of the media sampled were well below established standards. Surveillance of nonradioactive materials in the Oak Ridge environs shows that established limits were not exceeded for those materials possibly present in the air as a result of plant operations. The chemical water quality data in surface streams obtained from the water sampling program indicated that average concentrations resulting from plant effluents were in compliance with state stream guidelines with the exception of fluoride at monitoring Station B-1 which was 120% of the guideline. National Pollutant Discharge Elimination System (NPDES) permit compliance information has been included in this report. During 1981 there were no spills of oil and/or hazardous materials from the Oak Ridge

installations reported to the National Response Center. (ERA citation 07:048060)

DE82012859 MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Analyzing and Mapping Regional Land Use Trends by Combining LANDSAT and Topographic Data.
H. P. Foote, S. C. Blair, G. W. Wukelic, V. L. Coburn, and L. Leonhart. Dec 80, 10p PNL-SA-9139, CONF-810612-3
Contract AC06-76RL01830
International geoscience and remote sensing symposium, Washington, DC, USA, 8 Jun 1981, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Digital Landsat data and U-2 aerial photography for the Columbia Plateau region of eastern Washington and Oregon have been combined in order to estimate the total amount of cropland irrigated in this area during 1979 and the amount of growth in irrigated cropland between 1975 and 1979. Four Landsat scenes were required to cover the study area. Each of these scenes were classified scenes were then registered with a stereographic map projection and merged into one file. Irrigated cropland, water, and other land cover classes within this file were edited to conform with U-2 aerial photographs and Landsat color composite prints from 1975 and 1979. Land use data derived from 1975 Landsat imagery (Stephan et al., 1979, Leonhart et al., 1980) were then registered to the same map projection and a map displaying irrigated crop land in 1979 and growth of irrigated cropland between 1975 and 1979 was produced using the discrete table lookup method. The total irrigated cropland for 1979 was found to be 4281 square miles, which represents a 20% increase over 1975. The amount and location of the new irrigated cropland provides essential input into ongoing ground water studies for this region. (ERA citation 07:048063)

DE82013014 MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Indoor Air Pollution from Portable Kerosene-Fired Space Heaters, Wood-Burning Stoves, and Wood-Burning Furnaces.
G. W. Traynor, J. R. Allen, M. G. Apte, J. F. Dillworth, and J. R. Girman. Mar 82, 14p LBL-14027, CONF-820353-2
Contract AC03-76SF00098
Speciality meeting on residential wood and coal combustion, Louisville, KY, USA, 1 Mar 1982, Portions of document are illegible.
Available in microfiche only.

Laboratory tests were conducted on four portable kerosene-fired heaters to identify the pollutants they emit and their emission rates. Results show that carbon dioxide, carbon monoxide, nitric oxide, nitrogen dioxide, and formaldehyde are emitted by both radiant and convective kerosene heaters and that radiant heaters also emit trace amounts of fine particles. For some pollutants, emissions per caloric value of fuel consumed increase with decreasing wick length. Operation of a radiant and convective heater in a 27-m exp 3 chamber with 0.4 air changes per hour for one hour results in CO sub 2 concentratio well above the US occupational standard, and NO sub 2 concentrations well above California's short-term outdoor standard. Emissions from two wood-burning stoves and two wood-burning furnaces were studied under uncontrolled real-life conditions. The results, although less generalizable than those from laboratory tests of kerosene-fired heaters, also show that levels of carbon monoxide, nitric oxide, nitrogen dioxide, and sulfur dioxide increase during stove operation, although the pollutant levels observed were generally below occupational and outdoor air quality standards. (ERA citation 07:047996)

DE82013216 PC **A02**/MF **A01**
Donovan, Hamester and Rattien, Inc., Washington, DC.
Municipal Waste Energy Recovery.
30 Oct 79, 18p DOE/CS/20059-T19
Contract AC01-78CS20059

Materials recovery and energy recovery from municipal solid waste, offering at least a partial solution to a city's solid waste management and disposal problem, are discussed. The most important barriers and issues which relate to energy and materials recovery from waste in urban areas are discussed. Energy recovery practices and processes, environmental issues, and municipal market economics are considered.

DE82013251 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Development and Evaluation of Wastewater-Treatment Processes at the H-Coal Site in Catlettsburg, Kentucky. Volume I. Design Summary and R and D Task Identification.
G. E. Oswald, J. F. Walker, C. H. Brown, J. A. Klein, and R. K. Genung. Apr 82, 41p ORNL/TM-8213
Contract W-7405-ENG-26
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The design of a mobile process development unit (PDU) for coal conversion wastewater treatment and an overview of the associated R and D program for its use are described. The PDU consists of three modular units, which can be arranged in various sequences: carbon adsorption, ozonation, and reverse osmosis. Each of the units has a nominal flow capacity of approx. 60 mL of wastewater feed per second (1 gpm). The feed to the PDU will be taken as a sidestream from the existing wastewater treatment system at the H-Coal site. It will have been processed through oil-water separation and distillation stripping, and can be taken both before and after bio-oxidation by an activated sludge process. The ozonation system experimental parameters are ozone contact time, ozone treatment rate, column pressure, and pH. The system will be analyzed as a continuous stirred tank reactor. The calculated results will include ozone reaction, treatment, and absorption rates, contaminant depletion and reaction rates, ozone absorption and contaminant removal efficiencies, and ozone volumetric mass-transfer coefficients. The carbon adsorption system will be operated to obtain bed-depth-service-time (BDST) data for various carbons and operating conditions. The BDST method will yield the rate of carbon exhaustion as well as the minimum depth of carbon required to remove contaminants. Reverse osmosis will be studied to measure dissolved solids rejection efficiency, permeate recovery, and fouling characteristics of various commercially available membranes. (ERA citation 07:045604)

DE82013266 MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Environmental Information Document: L-Reactor Reactivation.
H. E. Mackey, Jr. Apr 82, 758p DPST-81-241
Contract AC09-76SR00001
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Purpose of this Environmental Information Document is to provide background for assessing environmental impacts associated with the renovation, restartup, and operation of L Reactor at the Savannah River Plant (SRP). SRP is a major US Department of Energy installation for the production of nuclear materials for national defense. The purpose of the restart of L Reactor is to increase the production of nuclear weapons materials, such as plutonium and tritium, to meet projected needs in the nuclear weapons program.

DE82013303 MF **A01**
New Jersey Inst. of Tech., Newark.
Sorbate Characteristics of Fly Ash. Quarterly Progress Report.
J. W. Liskowitz, J. Grow, M. Sheih, R. Trattner, and J. Kohut. Apr 82, 31p DOE/PC/30231-T2
Contract FG22-80PC30231
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This second quarterly report deals with evaluation of the fly ash sorbate characteristics for removal of organics in ash pond effluent as measured by Chemical Oxygen Demand (COD) and Arsenic. The Moessbauer spectra is being interpreted to identify the form of the iron compounds present in the fly ashes resulting from the different combustion conditions encountered in the three different types of coal fired boilers used in this investigation and also in the coal burned in these boilers. The results indicate that boiler conditions which produce fly ashes with sorbate characteristics that favor the removal of cations also favor the removal of the anion arsenic. The effectiveness of the fly ashes for removal of COD could not be determined because the ash pond effluents used were found to contain chloride concentration levels that interfered with the COD determination. Interpretation of the Moessbauer spectra revealed that the chemical state of the iron in both the coal and the resulting fly ash can be used to monitor the fluid nature of the ash in the boiler. The results also indicated that the chemical state of the iron in the eastern coals used in this study can influence the fusion temperature of the ash. (ERA citation 07:043269)

DE82013478 MF **A01**
Oak Ridge National Lab., TN.
Mathematical Model for Calculating Optimal Ozone Control Strategies.
G. A. Holton. 1981, 6p CONF-810488-3
Contract W-7405-ENG-26
International symposium on energy and ecological modelling, Louisville, KY, USA, 20 Apr 1981, Portions of document are illegible.
Available in microfiche only.

A simple deterministic mathematical model that calculates optimal ozone control strategies using representative control cost functions is presented. Results of application indicate that, depending on the regional distribution of ozone-precursor concentrations, the most economical ozone control strategy may be to control both nonmethane hydrocarbon and oxides of nitrogen rather than nonmethane hydrocarbon only. (ERA citation 07:044635)

DE82013507 PC **A03**/MF **A01**
Georgia Inst. of Tech., Atlanta.
Anaerobic Treatment of Gasifier Effluents. Quarterly Report No. 3.
W. H. Cross, E. S. K. Chian, F. G. Pohland, M. Giabbai, and S. R. Harper. Apr 82, 35p DOE/FC/10297-T2
Contract AC18-81FC10297

This report summarizes the work performed during the period from January 1, 1982 through March 31, 1982 on the DOE research program on Anaerobic Treatment of Gasifier Effluents (Contract No. DE-AC18-81FC10297). The major efforts have been directed toward the continued acclimation of three anaerobic treatment systems, construction and start up of an activated sludge nitrification system, construction and start up of a solvent extraction system and construction of an air stripping tower for ammonia removal. The progress of these efforts are depicted in a Gannt Chart. (ERA citation 07:045600)

DE82015830 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Solar Drying of Sewage Sludge.
J. C. Hedstrom, and J. S. Dreicer. May 82, 30p LA-9317-MS
Contract W-7405-ENG-36
Portions of document are illegible.
Microfiche only after original copies are exhausted.

An experimental and analytical study on solar drying of digested sewage sludge is summarized. Documentation of the results of sludge-drying by passive means in a greenhouse-type structure is presented. The experimental program measured the hourly rate of evaporation of water from test trays placed both outside and inside a greenhouse test cell. A computer model was written to predict the evaporation rate and was verified against the experimental data. The model was then used to predict the yearly performance of a greenhouse drying system for 26 cities in the United States. These results are tabulated and are compared with published lake-evaporation data.

DE82016052 PC **A06**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Water Quality Monitoring Service in Support of EPA NPDES Permit No. HI0110272; and Technical and Analytical Services in Support of OTEC-I Systems Operation. Subcontractor Final Report.
D. A. Ziemann. Jun 81, 108p DOE/NBM-2106052
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Daily, weekly and monthly sampling and analysis of water were conducted from the various OTEC (Ocean Thermal Energy Conversion) discharges. Results are reported for analyses for residual chlorine, total suspended solids, nutrients (ammonium, nitrate, phosphate, and silicate), and metals (Ti, Al, and Fe). Samples were also analyzed for chlorine demand, dissolved oxygen, total nitrogen, total phosphorus, pH, alkalinity, salinity, total organic carbon, and copper.

DE82900850 MF **A01**
Swedish Water and Air Pollution Research Lab., Stockholm.
Investigation of the Needs of the Treatment of Ecologically Dangerous Waste in Scandinavia 1979-1984.
K. E. Kulander. Nov 80, 44p IVL-B-592
In Swedish.Portions of this report are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The report contains the estimations of an inventory of ecologically dangerous waste in Scandinavia. The necessity of the treatment of the waste outside the waste producing industry is expected to increase in Denmark and Norway on to 1984. The waste treatment capacities in these countries are judged to be adequate whereas the combustion facilities are missing in Sweden and Finland. The external waste treatment needs in Sweden and Finland will remain constant during the next five years. A centralized combustion plant in Scandinavia does not seem to be economically justified owing to high transport costs. (ERA citation 07:044441)

DE82901197 MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Testing of the Possibility for the Use of BEWAG-Coal Cinder in Bituminous Supporting Layers of Asphalt Fastening.
H. W. Ueckert. 1981, 115p BMFT-FB-T-81-126
In German.Portions of this report are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

In order to develop further use of coal cinder granulate the suitability of that granulate has been tested for use as an additional material for bituminous supporting layers. Results: (1) The granulate can be used for asphalt supporting layers Type B according TVT 72. (2) The granulation scope 0/5 mm is recommended. (3) The granular share of the mineral mixture can amount up to 30% of weight. (4) Standard-Bitumen B 65 can be used as bituminous binders. (5) The optimum consistence of the bituminous materials has to be found according of an aptitude test. (ERA citation 07:042155)

DE82901243 MF **A01**
Tennessee Valley Authority, Norris. Div. of Forestry, Fisheries, and Wildlife Development.
Team Approach to Resource-Management Decision-Making.
Jun 76, 27p TVA/PUB-82/3, TN-B-16
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

A process is described for making environmentally sound land management decisions that consider public opinion and changes in socioeconomic values. The process generates flexible time and site specific management plans that are practical and readily implemented. A computer-assisted geographic information system, currently being developed by TVA for use in the land management decision process, provides up-to-date, land-related information. The decision process, assisted by the geographic information system, provides a means for evaluating the resource, locating candidate areas for each realistic management objective, and coordinating objectives to produce a cohesive land management plan. (ERA citation 07:048066)

DE82901912 MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Separate Step for Dry Removal of Chlorine and Fluorine from Flue Gases of Coal-Fired Power Plants.
D. Maier, and H. Nies. 1981, 60p BMFT-FB-T-81-070
In German.Portions of this report are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

R + D project to develop a separate step for dry removal of chlorine and fluorine from flue gases of coal-fired power plants. The process is based on the calcium-hydroxide pellets produced by Messrs. Grillo-Werke AG. The research project was divided into a laboratory phase and pilot unit investigations, and was accompanied by experiments regarding the disposal possibilities of the spent pellets. Since the experiments did not produce sufficient loading of the pellets, the test program was modified and additional laboratory investigations with simulated flue gas were carried out. The results of the investigation showed that under power plant conditions it is not possible to remove chlorine and fluorine with pellets made of diacid bases, as intended. (ERA citation 07:043264)

DE82902078 PC **A11**/MF **A01**
Academy of Natural Sciences of Philadelphia, PA.
Power-Plant Chlorination: A Biological and Chemical Assessment. Final Report, December 1981.
L. W. Hall, Jr., G. R. Helz, and D. T. Burton. Dec 81, 244p EPRI-EA-1750

An assessment is presented of the pertinent literature on chlorine chemistry and toxicity and a listing of research recommendations based on the review. Chlorine reaction rates and paths, chemical species, oxidant analyses, and organic products are discussed. Freshwater, estuarine, and marine toxicity methodologies are considered as well as specific tests on many organisms. Research recommendtions include refinement of existing methodologies and development of new techniques. (ERA citation 07:044733)

DE82902103 MF **A01**
Olympic Associates Co., Seattle, WA.
Liquid- and Solid-Waste Management for Coal-Conversion Processes. Final Report.
R. H. Bogan, R. T. Skrinde, and D. D. Jech. Feb 82, 146p EPRI-AP-2245
Portions of document are illegible. MN only.
Microfiche copies only.

This report presents the results of a technical assessment of pollution control technology for liquid and solid wastes expected from coal conversion processes. Treatment schemes which have been proposed for four typical liquefaction and gasification processes are evaluated and promising alternative approaches are identified. Analytical methods applicable to coal conversion waste streams are reviewed and assessment is made of the potential for stricter environmental standards resulting from better analytical techniques in the future. The implications of more stringent standards are discussed, including means to achieve zero discharge of liquid effluents. State-of-the-art treatment schemes are developed and detailed for each of four processes: Lurgi fixed bed gasification, Texaco entrained bed gasification, H-Coal catalytic liquefaction and Exxon Donor Solvent (noncatalytic) liquefaction. Various possible options for recycling of treated and untreated waste streams are identified for each process. It is found that the present data base is insufficient to assess completely the efficacy of proposed treatment schemes, and some waste management questions remain to be resolved. It is nonetheless concluded that these problems are surmountable and that effective means can be developed so coal conversion wastes can be handled in an environmentally acceptable manner. (ERA citation 07:052583)

DE82902516 PC **A04**/MF **A01**
South Dakota School of Mines and Technology, Rapid City. Inst. of Atmospheric Sciences.
Study of Total Emissions and Spot Emissions of Total Suspended Particulate at the South Dakota Cement Plant.
L. R. Johnson, and M. J. Flannagan. Aug 80, 57p NP-2902516

The project determined the source emissions of total suspended particulate (TSP) of the cement plant during a period of limited activity. Because of large stock piles and a slowdown in the building industry, the cement plant ceased production operations for the month of May in 1980. Routine maintenance and loading operations continued even though no actual production was underway. The situation provided the opportunity to separate plant operations contributions from natural and upstream contributions caused by broad expanse of exposed surface, sedimentation, and neighboring industry. The circumstances also permitted study of the change in emissions as the plant was gradually brought back into full production. Thus, the measurements were extended through the month of June, which included a two-week shutdown for maintenance of field generators and a wind instrument. (ERA citation 07:047998)

DE82903134 MF **A01**
Texaco, Inc., South El Monte, CA. Montebello Research Lab.
Coal Gasification Environmental Baseline Studies. Final Report.
J. R. Denchfield, R. M. Dille, H. A. Rhodes, W. V. Taylor, Jr., and S. B. Wallon. Mar 82, 101p EPRI-AP-2215
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

In conjunction with the commercial development of the Texaco Coal Gasification Process, environmental baseline studies were considered necessary. Accordingly, tests on oxygen and enriched air gasification of a water slurry of Illinois No. 6 coal were conducted at Texaco's Montebello Research Laboratory pilot plant. During the test runs, various solid, liquid, and gaseous streams were sampled. The samples were then analyzed, and the results compared with standards when applicable. The tests demonstrated that the Texaco Coal Gasification Process is an environmentally sound method of utilizing coal, in either electric power generation or for synthesis gas production. Essentially all sulfur compounds in the coal are converted to hydrogen sulfide or carbonyl sulfide, which can then be removed from the raw gas to very low concentrations by commercially proven acid gas removal technology. This feature eliminates the need for stack gas scrubbing to meet SO sub 2 limits if the treated gas is used as a boiler or turbine fuel. Volatile metals, particulate matter, and organic compounds other than methane and formate are present at very low levels in the fuel gas. Available water treatment technology will significantly reduce contaminant levels in the process effluent water. The slag produced would be classified as nonhazardous based on EPA Resource Conservation and Recovery Act (RCRA) criteria, but would be considered hazardous according to proposed State of California standards. (ERA citation 07:042168)

DE82903610 MF **A01**
Courtney (F.E.) and Associates, Atlanta, GA.
Investigation of the Cause of High Concentrations of TSP at the Cumberland Steam Plant Monitoring Stations 13 and 19.
9 Apr 79, 50p TVA/AQB-I-80/19
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

During 1978, total suspended particulate (TSP) concentrations in excess of ambient air quality standards were measured on several occasions at Cumberland Steam Plant monitoring stations 13 and 19. F.E. Courtney and Associates, under contract to TVA, investigated each of these excesses in detail. An extensive evaluation was conducted of air quality, meteorological, plant operational, and related data to identify any steam plant contribution to the excesses. It is concluded that the TSP measurements were not representative due to the influence of local fugitive dust sources. It is recommended that the data should be considered invalid for the purposes of representing impact of particulate emissions from Cumberland Steam Plant. It is also recommended that stations 13 and 19 should be relocated or eliminated from the Cumberland network.

DE82903611 MF **A01**
Engineering-Science, Inc., McLean, VA.
Investigation of an Exceedance of the Secondary NAAQS for Sulfur Dioxide Near the Kingston Steam Plant on February 20, 1979. Final Report.
Dec 79, 91p TVA/AQB-I-80/15
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

On February 20, 1979, the secondary ambient air quality standard for sulfur dioxide (SO sub 2) was exceeded at monitoring station 11 near Kingston Steam Plant. Engineering-Science, under contract to TVA, investigated the excess and prepared a report of their findings. The investigation included examination of meteorological, air monitoring, and source emissions data, and modeling of dispersion conditions to determine theoretical ambient concentrations contributed by major nearby point sources. The report concludes that neither Kingston Steam Plant nor any other point source caused the exceedance and identifies residential space heating as the most likely cause of the exceedance.

DE82903612 MF **A01**
Tennessee Valley Authority, Muscle Shoals, AL. Div. of Natural Resources Services.

Ambient No, NO sub 2 , and O sub 3 Measurements in the Vicinity of TVA'S Allen and Paradise Coal-Fired Steam Plants.
O. Huff. Nov 79, 67p TVA/AQB-I-80-11
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Investigations to evaluate the impacts of large coal-fired power plants on ambient levels of NO sub 2 in rural and urban areas were conducted at TVA's Paradise and Allen Steam Plants from May 1978 through December 1978. Both plants are equipped with cyclone furnaces and are expected to produce higher NO/sub x/ (NO + NO sub 2) emissions than other types of coal-fired boilers. Since the Paradise Steam Plant is relatively isolated from other major NO/sub x/ sources, ambient concentrations of NO/sub x/ around this plant are expected to be a true measure or indication of the ambient impact of NO/sub x/ emissions. On the other hand, ambient levels of NO/sub x/ in the area near Allen Steam Plant at Memphis, Tennessee, are expected to be higher, by comparison, due to numerous sources of NO/sub x/ within the immediate area.

DE82903613 MF **A01**
Tennessee Valley Authority, Muscle Shoals, AL. Div. of Natural Resources Services.
Analysis of a Total Suspended Particulate Concentration That Exceeded the Primary Ambient Air Quality Standard at the Bull Run Steam Plant on November 4, 1978.
N. T. Lee, and R. V. Carter. Jul 79, 29p TVA/AQB-I-80/2
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

On November 4, 1978, the area in the vicinity of the Bull Run Steam Plant experienced an intense inversion, resulting in very poor dispersion conditions, that would be conducive to elevated TSP concentrations. The TSP standard exceedance of 266 mu g/m exp 3 that occurred at station 23 on November 4, 1978, was not caused by the Bull Run Steam Plant. This exceedance can possibly be attributed to very poor dispersion conditions, agriculturally generated fugitive dust of a regional nature, coupled with drought conditions around the power plant that would cause fugitive dust to be generated from local dirt roads and agricultural activities, and with other industrial sources upwind of the monitor.

N82-31329/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Venturi Nozzle Effects on Fuel Drop Size and Nitrogen Oxide Emissions.
S. M. Johnson. Aug 82, 17p NAS 1.60:2028, E-1029, NASA-TP-2028

The effect of a venturi nozzle on the Sauter mean diameter of a water spray produced by a simplex pressure atomizing injector in a swirling airflow was determined. A Malvern particle and droplet size distribution analyzer, Type S.T. 1800, was used to measure D sub 32 of the water sprays. The water spray was studied at ambient temperature (293 K) and atmospheric pressure. The venturi reduced D sub 32 by an average of 30 percent when installed with a simplex injector and air swirler. The venturi primarily improved atomization of the injector spray by increasing relative air velocity. The small drop size enhanced vaporization and therefore decreased oxides of nitrogen in a combustor. The decrease in drop size provided by the addition of a venturi explains the results obtained in a previous small scale research combustor wherein NOx emission indices decreased as a result of this hardware modification.

N82-31827/0 PC **A04**/MF **A01**
Miljoestyrelsen, Roskilde (Denmark). Luftforureningslaboratoriet.
Air Pollution: Problems and Solutions.
J. Fenger. May 81, 59p DE82-900847, MST-LUFT-A-46
Text in Danish.

A survey of the abatement problems of air pollution and some proposed general solutions are presented. The main topics discussed are: strategies, tactics, techniques standard settings and transboundary transport. Typical pollutants are discussed which proved to be unremovable by one universal procedure. Air pollution is one of many cases of man environment interaction. Examples of cost benefit analysis applied to environmental planning are considered.

N82-31846/0 PC **A03**/MF **A01**
GKSS - Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.). Inst. fuer Werkstofftechnologie und Chemie.
MONITOR: A Measuring System for the Recording of Hydrographic and Chemical Data in Estuaries and Coastal Waters.
F. Schroeder, H. H. Kock, and P. H. Koske. 1981, 40p DE82-901926, GKSS-81/E/14
In German; English Summary.

Because of the hydrographic complexity of estuaries the monitoring of coastal waters presents certain problems. Therefore the monitoring system was directed especially to the unique situation in estuaries. The survey system MONITOR consists of five components. The central unit is a survey vessel with an analytical flow-through system and a digital shipboard computer. Analyses with more sophisticated analytical requirements are performed in a mobile laboratory or in a land labortory. In addition an aircraft equipped with a remote sensing package and a small motorboat with portable instruments is integrated into the survey system. These five components can be applied to different combinations just as the circumstances require.

N82-32080/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
The Noise Impact of Proposed Runway Alternatives at Craig Airport.
R. Deloach. Jun 82, 36p NAS 1.15:84503, NASA-TM-84503

Four proposed runway expansion alternatives at Craig Airport in Jacksonville, Florida have been assessed with respect to their forecasted noise impact in the year 2005. The assessment accounts for population distributions around the airport and human subjective response to noise, as well as the distribution of noise levels in the surrounding community (footprints). The impact analysis was performed using the Airport-noise Levels and Annoyance Model (ALAMO), an airport community response model recently developd at Langley Research Center.

PB82-242827 PC **A05**/MF **A01**
Calculon Corp., Rockville, MD.
Community Simulation System Financial Model. Volume 2: Data Collection Manual.
Final rept.
Aug 82, 88p CALC/R-82/02
Contract HUD-HC-6343
See also Volume 3, PB82-242835.Portions of this document are not fully legible.

The Community Simulation System (COMS) is a computer-based system for financial analysis of community development plans. The purpose of this manual is to provide a format for collection of data for direct input to the model.

PB82-242835 PC **A05**/MF **A01**
Calculon Corp., Rockville, MD.
Community Simulations System Financial Model. Volume 3: Terminal Operations Manual.
Final rept.
Aug 82, 90p CALC/R-82/03
Contract HUD-HC-6343
See also Volume 2, PB82-242827, and Volume 4, PB83-101121.

The Community Simulation System (COMS) is a computer-based system for financial analysis of community development plans. The purpose of this manual is to explain in a step-by-step manner all that is involved in running the financial computer model used in planning and evaluating land development programs. The manual is designed for the beginner and primarily covers the following areas: (1) preparing data for the FRAM. 8 model; (2) entering the data into the computer; and (3) giving the computer instructions to execute the model.

PB82-916604 PC **A04**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Safety Programs.
Transportation Safety Recommendations Adopted during the Month of August, 1982.
13 Aug 82, 63p NTSB-REC-82-4
Paper copy available on subscription, North American Continent price $55.00/year; all others write for quote.

This publication contains safety recommendations in aviation, highway and railroad modes of transportation adopted by the National Transportation Safety Board during the month of August, 1982.

PB83-101121 PC **A14**/MF **A01**
Calculon Corp., Rockville, MD.
Community Simulation System Financial Model. Volume 4: Systems Manual.
Final rept.
Sep 82, 320p CALC/R-82/04
Contract HUD-HC-6343
See also Volume 3, PB82-242835.Portions of this document are not fully legible.

The Community Simulation Systems (COMS) is a computer based system for financial analysis of community development plans. The purpose of this manual is to provide program maintenance information of the Financial Model code for use by the operators. The program delineated corresponds to the 12 financial reports contained in the Community Simulation System - Financial Model - Volume No. 1 - Technical Manual.

PB83-105536 PC **A10**/MF **A01**
Oklahoma State Univ., Stillwater. School of Civil Engineering.
Treatment Compatibility of Municipal Waste and Biologically Hazardous Industrial Compounds. Volume I.
Final rept. 15 Jul 77-15 Jul 79,
A. F. Gaudy, Jr., D. F. Kincannon, and T. S. Manickham. Jun 82, 203p EPA-600/2-82-075A
Grant EPA-R-805242
See also Volume 2, PB83-105544.

The overall objective of this research was to gain information on the effect of priority pollutants on the performance of publicly owned treatment works employing activated sludge as the method of secondary treatment. The study was designed to gain information on the effects of a wide array of compounds and to determine the most useful study procedures to be used in assessing effects for the purpose of aiding the Agency in formulating regulatory policy in regard to pretreatment prior to discharge to the publicly owned treatment works.

PB83-105544 PC **A13**/MF **A01**
Oklahoma State Univ., Stillwater. School of Civil Engineering.
Treatment Compatibility of Municipal Waste and Biologically Hazardous Industrial Compounds. Volume II (Appendix A).
Final rept. 15 Jul 77-15 Jul 79,
A. F. Gaudy, Jr., D. F. Kincannon, and T. S. Manickham. Jun 82, 276p EPA-600/2-82-075B
Grant EPA-R-805242
See also Volume 1, PB83-105536.

The overall objective of this research was to gain information on the effect of priority pollutants on the performance of publicly owned treatment works employing activated sludge as the method of secondary treatment. The study was designed to gain information on the effects of a wide array of compounds and to determine the most useful study procedures to be used in assessing effects for the purpose of aiding the Agency in formulating regulatory policy in regard to pretreatment prior to discharge to the publicly owned treatment works. The data collected during this study were so numerous it was impossible to include it as part of the main report. Therefore, the appendix has been prepared to prove the raw data collected during the two year study.

PB83-106237 PC **A13**/MF **A01**
American Meteorological Society, Boston, MA.
Air Quality Modeling and the Clean Air Act: Recommendations to EPA on Dispersion Modeling for Regulatory Applications.
1981, 299p
Sponsored in part by Environmental Protection Agency, Washington, DC.

Through the Clean Air Act and its amendments, the U.S. government endeavors to protect and enhance the quality of the nation's air resources by a variety of

air quality management systems. Source emissions, meteorological observations, air quality models, and air quality data are the basic components of an air quality management system. Air quality models provide a scientific means of relating emissions and atmospheric processes to provide estimates of ambient air quality values. The models consist of mathematical equations relating the release of effluents into the atmosphere to expected concentrations in ambient air. Air quality models, therefore, can be used to identify and to evaluate the level of controls required to solve industrial and urban air-pollution problems. This report addresses the use of air quality models in a regulatory framework and represents the effort of the American Meteorological Society (AMS) under the original Cooperative Agreement with the Environmental Protection Agency, September 6, 1979, through March 31, 1981.

PB83-107961 PC **A03**/MF **A01**
Krofta Engineering Corp., Lenox, MA.
Development of Innovative Sandfloat System for Water Purification and Pollution Control.
Technical rept. Jun 81-Jul 82,
Milos Krofta, and Lawrence K. Wang. 10 Jul 82, 42p KEC/07-82/1
Sponsored in part by Filtration Society, Shippensburg, PA., and Pollution Engineering, Northbrook, IL.

An innovative SANDFLOAT system has been designed and developed for environmental control. The process system which consists of chemical flocculation, dissolved air flotation and sand filtration, substantially improves upon the conventional flocculation/sedimentation/filtration system in performance capability, operation, maintenance and energy use. This report introduces the first full scale SANDFLOAT plant (Capacity = 1 MGD) built in the entire world. Its special engineering features, environmental control applications, operations, maintenance, cost and energy usage compared to that of conventional process systems are presented in detail.

PB83-109629 PC **A02**/MF **A01**
National Highway Traffic Safety Administration, Washington, DC. Traffic Safety Programs.
Appendix A - Bibliography of Effectiveness (Impact) Evaluation Report Including Program Area and Author.
Evaluation summary rept. 1966-81,
William E. Tarrants. Mar 82, 25p DOT-HS-806 145

Appendix A of the state-of-the-art report 'Effectiveness and Efficiencies in Traffic Safety Programs' contains a bibliography of effectiveness (impact) evaluation reports which contain the available scientific evidence of countermeasure effectiveness. The bibliography is organized alphabetically by author within the following major program areas--alcohol safety studies, driver education studies, driver licensing and driver improvement studies, emergency medical services studies, motorcycle studies (including helmets, licensing and training), moped safety studies, occupant restraint studies, pedestrian and bicyclist studies, police traffic services studies, pupil transportation studies, traffic records studies, and miscellaneous studies.

PB83-109637 PC **A07**/MF **A01**
National Highway Traffic Safety Administration, Washington, DC. Traffic Safety Programs.
Effectiveness and Efficiencies in Traffic Safety Programs - Overview. I. Introduction and Summary. II. Summaries of Highway Safety Program Areas. III. Summary of Docket Submissions.
Evaluation summary rept.,
Robert E. Voas, and William E. Tarrants. Mar 82, 141p DOT-HS-806 130

This report provides an overview of a state-of-the-art study of highway safety program areas conducted by NHTSA, U.S. Department of Transportation in response to the intent of Congress expressed in the Omnibus Budget Reconciliation Act of 1981. The overview paper is divided into three sections, each addressing certain aspects of the study. Section I, 'Introduction And Summary,' describes the study scope, objectives and structure, and provides an introduction to the complete report. It also includes a brief summary of the national traffic safety problem, including recent accident trends, estimates of the overall potential effectiveness of the highway safety program and a summary of program benefits. Section II, 'Summaries of Highway Safety Program Areas,' includes a summary of each of the program papers prepared by NHTSA and FHWA for this report. The program areas are grouped within the general categories of roadway factors: safety construction and operational improvement effectiveness; vehicle factors; human factors; special road and user groups; human factors; deterrence of risk taking; reducing injuries among crash involved vehicle occupants; reducing death, disability, pain, and suffering among accident victims; and program administration. Section III, 'Summary of Docket Submissions,' summarizes comments received in each of 18 program areas.

PB83-110049 PC **A09**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Sea Grant Coll. Program.
Report of North and Mid Atlantic Region Conference on Marine Pollution Problems, Durham, New Hampshire, June 11-13, 1980.
Working paper no. 5,
D. A. Levey. Sep 80, 192p NOAA-81020902

This report is the product of the North and Mid-Atlantic Regional Conference held at the New England Center in Durham, New Hampshire, June 10-13, 1980. The Conference was organized into five working panels: Coastal Land Use Practices and Recreation, Marine Energy, Marine Mineral Resources, Marine Transportation, and Marine Waste Disposal. Each panel was then required to accomplish four objectives: Develop a series of statements defining significant marine pollution problems; and identify the related set of information needs required to deal with each problem area.

PB83-110056 PC **A05**/MF **A01**
Alaska Sea Grant Coll. Program, Fairbanks.
Report of Alaska Region Conference on Marine Pollution Problems, Anchorage, Alaska, June 3-5, 1980.
Working paper no. 2.
Sep 80, 99p NOAA-81020904

Participants at the Alaska Region Conference held in Anchorage, Alaska on June 3-5, 1980, emphasized the need for long-term work on the effects of low-level, chronic pollution, multi-disciplinary process oriented research at the community/ecosystem level, and innovative approaches to the detection of subtle changes in the biological condition of species and major deleterious impacts on the indigenous biota. Other high priorities were concerned with transportation (mainly oil pollution), and fish processing and urban liquid wastes. Each group considered impact and associated information needs by geographical region as follows: Gulf of Alaska, Bering Sea, and Arctic (i.e., Chukchi and Beaufort Seas).

PB83-110098 PC **A03**/MF **A01**
New York State Dept. of Transportation, Albany. Engineering Research and Development Bureau.
Short-Slab Unreinforced Concrete Pavement and Shoulders: A Five-Year Performance Summary,
Interim research rept. no. 5,
John M. Vyce. May 82, 34p RR-95, FHWA/NY/RR-82/95

In 1975, two contracts for I 88 were built with short unreinforced concrete slabs and concrete shoulders. They were separated by another contract with standard 63-ft 6-in. mesh-reinforced slabs and asphalt shoulders, which is being used for control purposes. Also, two portions on each short-slab contract were built with slab lengths of 23 ft 4 in. and 26 ft 8 in., and one of these sections on each contract was constructed with no longitudinal joint between lanes. In addition, a concrete secondary road relocated as part of another nearby I 88 contract was placed 7 in. thick without reinforcement, with slab lengths in the pattern of 18-22-16-20 ft. After 1 year of service, one of the short-slab pavements on the mainline exhibited an unusual amount of deterioration. Random and longitudinal cracks were present in several areas, as were spalls over the tie-bars across the pavement-shoulder longitudinal joint. This situation led to more intensive monitoring and observation on the experimental and control pavements than had been anticipated during the initial years of service. The results, as well as interpretations and recommeded design considerations, are presented in this report.

PB83-110247 PC **A03**/MF **A01**
National Highway Traffic Safety Administration, Washington, DC. Traffic Safety Programs.
Effectiveness and Efficiencies in Emergency Medical Services.
Evaluation summary rept. 1966-81,
Thomas Zieziulewicz, and William E. Tarrants. Mar 82, 38p DOT-HS-806 143

The EMS system has grown and will continue to operate and develop nationally largely on the basis of State and local incentives and funding support. The combined EMS system consists of three subsystems--emergency detection and notification, emergency response and treatment and emergency command and control. Potentially effective additional support systems include use of helicopters and training of police officers as first responders. Potentially effective programs include improved data collection, a public information program, and a program whereby Emergency Medical Technicians would assume a greater role in the alcohol testing of accident victims. A summary of the documented evidence of effectiveness of the EMS system and its subsystems is provided in the report.

PB83-110254 PC **A02**/MF **A01**
National Highway Traffic Safety Administration, Washington, DC. Traffic Safety Programs.
Effectiveness and Efficiencies in Pupil Transportation Safety.
Evaluation summary rept. 1966-81,
Lawrence Pavlinski, David Soule, and William E. Tarrants. Mar 82, 24p DOT-HS-806 134

Safety-related problems associated with school buses and their operation include non-standard signals and markings on school buses; varying laws and operating procedures among the States; varying amount, quality and context of pupil instruction regarding safe practices in and around the school bus; driver errors; operating at unguarded rail crossings; operation under adverse weather conditions (e.g., dense fog in the morning; lack of driver and passenger restraint systems; and inadequate system support at the State level. Countermeasures applied to these problems include school bus driver selection and training, uniform identification of school buses, school bus stop laws, pupil instruction, and coordinated administration of a State pupil transportation safety program.

PB83-110270 PC **A03**/MF **A01**
National Highway Traffic Safety Administration, Washington, DC. Traffic Safety Programs.
Effectiveness and Efficiencies in Traffic Records.
Evaluation summary rept. 1966-81,
Clayton E. Hatch. Mar 82, 34p DOT-HS-806 140

Traffic records, encompassing all records pertaining to the highway safety activities of a State, play a significant role in the highway safety effort. They provide the support necessary to develop, implement and evaluate impact countermeasures such as highway engineering improvements and selective enforcement projects. They form the information base for managing the highway safety program at all governmental levels. At the State level, traffic records provide the data for identifying safety problems, developing corrective measures and evaluating actions taken. State traffic records are the primary source of data for the formation of national data bases. The National Highway Traffic Safety Administration's (NHTSA) National Center for Statistics and Analysis depends on State data for its two major data bases, the Fatal Accident Reporting System and the National Accident Sampling System. The Federal Highway Administration (FHWA) looks to State data, for example, to identify truck safety problems for administration of its motor carrier safety program and to identify safety problems which should be addressed by the highway construction program. The report presents an overview of past accomplishments, and present status.

PB83-110395 PC **A03**/MF **A01**
National Highway Traffic Safety Administration, Washington, DC. Traffic Safety Programs.
Program Paper Central Authority and Planning and Administration Issues.
Evaluation summary rept. 1966-81,
Joseph R. Jeffrey. Mar 82, 40p DOT-HS-806 144

The report describes the highway safety environment prior to the Highway Safety Act of 1966, outlines the legislative and administrative history, and summarizes the comments submitted to the Docket. Then it summarizes the trends and numbers of each SHSA staff and the amounts of Federal 402 funds obligated to P&A costs since 1967 compared to the total Federal

402 funds available for obligation. Finally, the report describes the accomplishments of the SHSA's in administering the State highway safety programs.

PB83-110411 PC **A03**/MF **A01**
National Highway Traffic Safety Administration, Washington, DC. Traffic Safety Programs.
Effectiveness Paper Bicyclist Safety Programs.
Evaluation summary rept. 1966-81,
Pat Ehrlich, Alfred Farina, Lawrence Pavlinski, and William E. Tarrants. Mar 82, 28p DOT-HS-806 132

The bicycle safety focus within NHTSA involves improving the behavior of bicyclists and drivers and, within FHWA, bicyclists facilities such as separate bike paths; bike lanes on roadways; and bikeway signs, signals and markings. Effective bicycle accident countermeasure projects include community bicycle programs, enforcement/court/rodeos, safety towns, bicycle monitors, and a bikeways master plan. Programs which promise effectiveness include in-school and on-bike training/education, safety messages, model regulations, conspicuity, and protective clothing and equipment for cyclists. Programs which increase efficiency and reduce costs include a checklist instrument for assessing safety relevance of cyclist programs, construction of bicyclist facilities and accident classification methods.

PB83-110429 PC **A03**/MF **A01**
National Highway Traffic Safety Administration, Washington, DC. Traffic Safety Programs.
Effectiveness and Efficiencies in Pedestrian Safety.
Evaluation summary rept. 1966-81,
Pat Ehrlich, Alfred Farina, Lawrence Pavlinski, and William E. Tarrants. Mar 82, 29p DOT-HS-806 131

The administration's countermeasure focus has been on planning, design, construction and use of pedestrian facilities such as sidewalks, pathways, bridges and underpasses. Selected countermeasures include education, safety messages, model regulation, traffic engineering, and enforcement. Also included are programs for the elderly and handicapped, parents and preschool children, and improved visibility.

PB83-110619 PC **A04**/MF **A01**
Massachusetts Univ., Amherst. Dept. of Civil Engineering.
A Manual of Procedures to Apportion Costs of Rural Public Transportation Among Participating Towns and Human Service Agencies.
Final rept.,
John Collura, and Dale Cope. 29 Jun 82, 73p DOT-RSPA-DMA-50-82/3
Contract DOT-RC-82028

The purpose of this Manual is to provide assistance and guidance in the design and evaluation of procedures which can be used to apportion these costs of rural public transportation among participating towns and human service agencies. Each procedure consists of an equation or formula which arrives at assessments or charges for services based on the application of one more variables. Examples of such variables include: population, property valuation, vehicle miles, vehicle hours, passenger trips, and passenger miles. Each variable is examined in terms of the particular characteristic or quality which it is designed to measure. Procedures to apportion or allocate the costs of rural public transportation may be formulated using one or more of these component variables, in various combinations, and with varying results.

PB83-110627 PC **A06**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
Apportioning the Costs of Rural Public Transportation among Participating Towns and Human Services Agencies.
Final rept.,
John Collura, Dale Cope, James Male, Paul W. Shuldiner, and Japhet Nkonge. 29 Jun 82, 109p DOT-RSPA-DMA-50-82/2
Contract DOT-RC-82028

The major objectives of this research are: (1) To test the cost allocation procedures developed during the first year in five rural sites (regions) which incorporated a variety of transportation service, demographic, and geographic characteristics; (2) Evaluate the procedures in terms of their data requirements, ease of understanding, and ability to produce equitable results; and (3) Develop a cost allocation manual to serve as a guide to local officials in the process of implementing rural public transportation programs. The evaluation framework and the findings of this study provide local transportation officials and decision-makers with an objective mechanism for evaluating available cost allocation procedures and/or for designing a unique procedure to suit local concerns and circumstances. In order to make these results widely available, a Users' Manual has been prepared which outlines in a step-wise fashion how to use this framework. A summary of the contents of the Users' Manual is provided in the body of this report. This manual will be of importance to public transportation officials and social service agency administrators who are considering the implementation of a cost allocation procedure.

PB83-110650 PC **A06**/MF **A01**
Great Smoky Mountains National Park, Gatlinburg, TN. Uplands Field Research Lab.
The Effect of the European Wild Boar (Sus scrofa) on the Woody Vegetation of Gray Beach Forest in the Great Smoky Mountains.
Research/Resources Management rept.,
Mark H. Huff. Oct 77, 112p NPS/R/RM-18

The European wild boar (Sus scrofa) was introduced into the mountains of North Carolina in 1912 and since has spread into the Great Smoky Mountains National Park. Omnivorous feeding and rooting disturbance by this exotic species is a management problem in the park. The Gray Beech forest is extensively used by wild boar. Vegetative sprouts of beech in disturbed areas were 4 to 45 times more numerous than sprouts in undisturbed areas.

PB83-110981 PC **A09**/MF **A01**
Booz-Allen and Hamilton, Inc., Philadelphia, PA. Transportation Consulting Div.
Planning for the Phase-In of Fixed-Route Accessible Buses.
Final rept.,
Subhash Mundle, Janet Kraus, Ellen Kret, and Dennis Cannon. Feb 82, 179p DOT-I-82-22
Prepared in cooperation with Synergy Consulting Services, Northridge, CA. and Urban Mass Transportation Administration, Washington, DC. Office of Planning Assistance.See also PB80-184146.

Transit systems across the country are planning to introduce fixed-route accessible bus service. This report has been prepared to assist these transit systems and Metropolitan Planning Organizations (MPOs) in the phase-in of fixed-route accessible buses. Technical guidance has been prepared on key functional areas where the impact of accessible service will be the greatest. These areas are citizen particpation; vehicle procurement and facility modifications; service planning and operations; maintenance; training; marketing; and monitoring and evaluation.

PB83-111377 PC **A04**/MF **A01**
Louisiana State Univ., Baton Rouge.
Report of South Atlantic and Gulf Region Conference on Marine Pollution Problems, New Orleans, Louisiana, June 10-12, 1980.
Working paper no. 4.
Sep 80, 62p NOAA-81020903
Sponsored in part by Federal Coordinating Council for Science, Engineering and Technology, Washington, DC.

The purpose of the regional conference was to characterize the nature and magnitude of regional marine pollution problems, to identify the information required to manage these problems, and to assign priorities to the information needs. This document is the report of the Gulf/South Atlantic Ocean Pollution Conference held in New Orleans on June 10-12, 1980. The issues dealt with included: Coastal habitat modification and non-point sources of pollution; marine resource utilization; spills and intermittent releases, and marine waste disposal.

PB83-111435 PC **A06**/MF **A01**
Illinois Dept. of Energy and Natural Resources, Springfield.
Illinois Agricultural Water Quality Management Programs - A Status Report. Conference Proceedigs of April 13, 1982 at Department of Agriculture Auditorium, State Fairgrounds, Springfield, Illinois.
Jun 82, 106p DOCUMENT-82/15
Sponsored in part by Illinois State Environmental Protection Agency, Springfield, and Illinois Dept. of Agriculture, Springfield.

Proceedings of a one-day conference held on April 13, 1982, for former members of the Task Force on Agriculture Non-Point Sources of Pollution and others involved in or affected by implementation of Illinois' Water Quality Management Plan. Twenty-seven papers are found in the proceedings on various topics including soil erosion, pesticides, fertilizers, livestock wastes and forestry.

PB83-111856 PC**$36.00**/MF**$36.00**
Construction Industry Research and Information Association, London (England).
Tunnel Waterproofing.
Jul 81, 61p CIRIA-81, ISBN-08617-125-6
Also pub. in ISSN-0305-408X.

The report deals mainly with methods of waterproofing preformed segmental linings, and outlines the provisions for unlined tunnels and for waterproofing tunnels lined with concrete in situ. The need (or otherwise) for watertightness is discussed, and recommendations are made, based upon existing evidence, for appropriate standards of permissible leakage, their formal classification, and suitable units of measurements. Factors are considered which may influence the selection of permanent waterproofing elements for a tunnel lining system, and an appreciation is made of construction expedients and temporary works which may be an equally essential part of waterproofing the tunnel.

PB83-112227 PC **A05**/MF **A01**
Oregon State Univ., Corvallis. Sea Grant Coll. Program.
Report of West Coast Region Conference on Marine Pollution Problems, Portland, Oregon, June 17-19, 1980.
Working paper no. 6,
Robert Serra. Sep 80, 90p NOAA-81020907
Sponsored in part by Federal Coordinating Council for Science, Engineering, and Technology, Washington, DC.

The Pacific Regional Conference to address problems and information needs regarding marine pollution of the U.S. Pacific coastal states and Hawaiian and Pacific Islands was convened in Portland, Oregon on June 16-19, 1980. Participants were charged with the accomplishment of four objectives: Develop a series of statements identifying significant marine pollution problems in the Pacific Region; Define a set of information needs for each problem area; Recommend priorities for the sets of information needs; and Provide rationale for priorities assigned to the sets of information needs. In addition to consideration of marine pollution problems by areas, the following problems and information needs were discussed: land-use practices, recreation and boating; marine waste disposal; marine energy; and marine mining.

PB83-112284 PC **A08**/MF **A01**
Lawson (Barry) Associates, Inc., Boston, MA.
Water Conservation Planning Workshops - Trainer's Manual.
Apr 82, 151p
Sponsored in part by Missouri Basin States Association, Omaha, NE.

The training program presented in this Manual represents the collaborative work of several professionals, agencies and groups during the past three years to present material and information which is useful to local communities confronted by current or potential water shortages. It has been designed to promote understanding of the shortage problem and the development of a strategy or plan for solving this problem.

PB83-112607 PC **A03**/MF **A01**
Public Technology, Inc., Washington, DC.
Parking and Traffic Enforcement.
Sep 80, 33p DOT-I-80-40

This bulletin provides a review of parking and traffic enforcement issues as they relate to protection of the public, improvement of traffic flow, and parking management in large cities. Information regarding civilian parking enforcement agents, administrative adjudication of parking infractions, enforcement levels, towing, booting, data problems and political problems are reviewed. The report also includes a list of contacts and current programs in this area, and an annotated bibliography.

PB83-112623 PC **A15/MF A01**
Public Technology, Inc., Washington, DC.
Transportation Needs and Programs Summary.
Final rept.
Jan 81, 347p
Sponsored in part by Department of Transportation, Washington, DC. Office of the Secretary.

This report describes transportation needs identified by the Urban Consortium for Technology Initiatives, a network of 37 large cities and counties. For the 141 needs covered, a statement of the problem, solution considerations, a summary of selected innovated local work with contacts for further information, and Federal work on the topic are included.

PB83-112631 PC **A18/MF A01**
Cambridge Systematics, Inc., MA.
Downtown Crossing: Auto Restricted Zone in Boston.
Final rept. 1977-80,
Glen Weisbrod, William Loudon, S. Pitschke, P. Reid, and B. Rittenhouse. Jul 82, 425p DOT-TSC-UMTA-82-21, UMTA-MA-06-0049-82-3
Contract DOT-TSC-1405

The auto restricted zone directly affects six different streets in the core retail area. Auto traffic was banned on three blocks of the main retail street, Washington Street. This street section was originally a transit mall, but much of it is now a fully pedestrianized zone. Another major retailing street which intersects Washington Street, Winter Street/Summer Street, was also closed to auto traffic and converted to a pedestrian zone. Auto restrictions were also implemented on nearby Franklin, Bromfield, School and Hawley Streets. A total of eleven blocks were closed to auto traffic, in addition to one block previously closed. The project was planned and implemented in a relatively short time period. Physical image improvements, such as bricking of the street surfaces and the placement of benches, new lights and other pedestrian amenities, were done the next summer, and essentially completed by September 1979.

PB83-112714 PC **A04/MF A01**
Public Technology, Inc., Washington, DC.
Institutional Framework for Integrated Transportation Planning (Revised Ed.).
Jan 80, 69p DOT-I-80-27
See also PB-265 459.

This bulletin's focus is on the institutional issues associated with highway and transit planning for urban areas. It explores the planning process, particularly its regulatory background, various institutional issues and problems, technical issues in planning, and future directions for the process. The document also summarizes current programs and research on these issues, and includes an annotated bibliography on the topic.

PB83-112763 PC **A03/MF A01**
National Research Council, Washington, DC.
Assessing Aesthetic Attributes in Planning Water Resources Projects.
Final rept.
Aug 82, 32p
Sponsored in part by Department of the Army, Washington, DC.

The report assesses procedures for evaluating the effects of water resources projects on aesthetic resources and recommends the use of survey techniques for eliciting holistic responses of the lay public to simulated changes in scenes to reflect aesthetic values of visual resources.

PB83-112912 PC **A10/MF A01**
Great Smoky Mountains National Park, Gatlinburg, TN. Uplands Field Research Lab.
Ecological Survey of Abrams Creek in the Great Smoky Mountains National Park.
Research/Resources Management rept.,
Raymond C. Mathews, Jr. Oct 78, 211p NPS/R/RM-28

A survey of the water quality of Abrams Creek and its tributaries, in and around the Cades Cove area of Great Smoky Mountains National Park, was conducted. The objectives of the study were to: monitor the physical and chemical features; determine the structure of the benthic macroinvertebrate community; determine the bacteriological water quality and define problem areas; correlate fish distributions and population structure (species) with water quality; and monitor the algal periphyton (diatoms) community.

PB83-113563 PC **A99/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Emission Standards and Engineering Div.
Stationary Internal Combustion Engines. Standards Support and Engironmental Impact Statement. Volume I: Proposed Standards of Performance.
Draft rept.
Jan 79, 786p EPA-450/2-78-125A

Standards of performance to control nitrogen oxides from new, modified and reconstructed stationary internal combustion engines in the U.S. are being proposed under Section 111 of the Clean Air Act. This document contains information on the internal combustion engine industry and emission control technology, a discussion of the selected emission limits and the supporting data and the alternatives which are considered, and analyses of the environmental and economic impacts of the proposed standards.

PB83-113746 PC **A21/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Metallic Mineral Processing Plants - Background Information for Proposed Standards. Volume 1: Chapters 1-9.
Aug 82, 488p EPA-450/3-81/009A

Standards of performance for the control of particulate matter emissions from metallic mineral processing plants are being proposed under the authority of Section 111 of the Clean Air Act. These standards would apply to facilities at processing plants for which construction or modification began on or after the date of proposal of the regulation. This document contains background information and environmental and economic impact assessments of the regulatory alternatives considered in developing proposed standards.

PB83-113753 PC **A15/MF A01**
Massachusetts Inst. of Tech., Cambridge. Sea Grant Coll. Program.
Analysis of Permanent Displacement from Cyclic Loading of Foundations,
Alfredo M. Urzua, and W. Allen Marr. Jul 82, 346p
MITSG-81-9, NOAA-82080609
Grant NA79AA-D-00101

A linear viscoelastic formulation with parameters from stress path type tests promises a rational means to predict permanent displacements from drained cyclic loading with sufficient accuracy for most practical purposes. The finite element program, CYPEDE, gives an analytical procedure to calculate these permanent displacements. In the one-dimensional case permanent strains predicted with the model using parameters from triaxial tests agree with measured strains, both in magnitude and rate. Predicted horizontal stress considerably exceeds the measured horizontal stress. No unique explanation exists to explain this discrepancy. In evaluating the formulation for two-dimensional conditions the pattern and mechanism of displacement appear reasonable based on three series of analysis: Parametric studies of a cyclically-loaded flexible foundation comparison with Marr and Christian's approach, and comparison with physical model results in the centrifuge.

PB83-113829 PC **A11/MF A01**
Hitachi Shipbuilding and Engineering Co. Ltd., Tokyo (Japan).
Hitachi Zosen NOx Flue Gas Treatment Process. Volume 1. Pilot Plant Evaluation.
Final rept. May 78-Feb 82,
Shingo Tanaka, and Richard Wiener. Sep 82, 243p
EPA-600/7-82-057A
Contract EPA-68-02-2675
See also Volume 2, PB83-113837.Color illustrations reproduced in black and white.

The report gives results of a pilot plant evaluation of the Hitachi Zosen NOx flue gas treatment process. The project--evaluating selective catalytic reduction (SCR) of NOx on a coal-fired source--operated for 1-1/2 years. A newly developed catalyst, NOXNON 600, was successfully applied at the 0.5 MW pilot plant on a slipstream from George Power Co.'s Plant Mitchell near Albany, GA: it demonstrated 90% NOx removal efficiency for over 5600 hours. Tests to operate the catalyst outside of design specifications showed good tolerance to adverse situations. The project was the first demonstration and evaluation of NOx SCR technology on a coal-fired source in the U.S. Project results indicate that the process is a viable NOx control technology option; however, some technical concerns remain before the technology can be considered commercially available and demonstrated for coal-fired sources in the U.S.

PB83-113837 PC **A10/MF A01**
Radian Corp., Austin, TX.
Hitachi Zosen NOx Flue Gas Treatment Process. Volume 2. Independent Evaluation.
Final rept. Feb 80-Feb 82,
J. M. Burke. Sep 82, 206p EPA-600/7-82-057B
Contract EPA-68-02-3171
See also Volume 1, PB83-113829.

The report gives results of an independent evaluation of the Hitachi Zosen (HZ) NOx flue gas treatment process, one of two selective catalytic reduction (SCR) of NOx with ammonia processes (pilot-scale tested under EPA sponsorship) treating flue gas slipstreams from coal-fired boilers.

PB83-115147 PC **A02/MF A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Further Examination of the East Chicago, Indiana, Highway Ramp Collapse Could Help Prevent Similar Accidents.
2 Sep 82, 25p GAO/CED-82-120, B-208748

The April 1982 collapse of a highway ramp under construction in Indiana killed 13 workers and injured 17. The ramp is part of a highway construction project receiving 90 percent Federal funding. Several Federal, State, local, and private agencies are investigating the accident. The National Bureau of Standards, assisted by the Federal Highway Administration, is investigating the technical cause of the collapse for the Occupational Safety and Health Administration. Federal action to begin the technical investigation was prompt, and the Bureau appears well qualified to determine the cause. GAO, however, is concerned that Federal and State agencies were not examining and had no plans to examine systemic aspects, such as Federal and State construction monitoring and inspection. GAO is recommending that this be done. GAO is also recommending that the Congress, in considering the need to grant authority to an existing Federal agency to direct and coordinate investigations, provide that such authority enable the agency to conduct independent investigations of both the technical and systemic aspects of accidents involving Federal and federally assisted construction projects.

PB83-115360 PC **A14/MF A01**
Illinois Inst. of Tech., Chicago. Pritzker Dept. of Environmental Engineering.
Identification, Evaluation, and Control of Toxic Substances in Industrial Effluents: Preliminary Proceedings of Workshop,
Glenn D. Pratt, James W. Patterson, Gilman Veith, Lawrence L. Tavarides, and George Herr. Jun 82, 303p
Also pub. as Illinois Inst. of Tech., Chicago. Notre Dame Industrial Waste Elimination Research Center rept. no. IIT/IWERC-82/1. Sponsored in part by Environmental Protection Agency, Chicago, IL. Region V.

Prepared papers of the speakers at the workshop on the Identification, Evaluation, and Control of Toxic Substances in Industrial Effluents, held at the Conrad Hilton Hotel; Chicago, Illinois, on June 15-16, 1982. The workshop was designed for academia, industry, and government and focused on the surfacing, evaluation, and control of toxic substances in wastewater discharges. The technical presentations featured actual case histories on the use of detailed manufacturing process evaluation to surface toxicants, the use of manufacturing process modification to eliminate or reduce the formation of toxicants, and the analysis of chemical structure/activity relationships to predict the potential for toxicity, persistance, bioaccumulation, mutagenicity, etc. The workshop was co-sponsored by the U.S. Environmental Protection Agency, the U.S. Department of Commerce, the Illinois Chamber of Commerce, and the Illinois Institute of Technology. The appendix contains a list of attendees.

PB83-116897 PC **A03/MF A01**
Pittsburgh Univ., PA. Dept. of Metallurgical and Materials Engineering.

Organic Emissions from Iron Ore Sintering Plants: Determination of Causes and Methods of Abatement.
Final rept. Jul 77-Jul 78,
Robert A. Stoehr. Oct 82, 37p EPA-600/2-82-091
Grant EPA-R-805304
Sponsored in part by American Iron and Steel Inst., Washington, DC.

The report gives results of a laboratory study to develop basic information on the emission of organics from iron ore sinter beds. Samples of sinter bed mix components (including several types of iron ore fines, blast furnace flue dust, rolling mill scale, anthracite coal, and limestone) were obtained from three sinter producers. Small samples were heated in a tube furnace under a 100 m1/m in flow of N2 or air. A combination of total organic analysis and full chromatographic analysis was used to determine the rate of organic emissions as a function of temperature and to characterize the nature of the emissions. Maximum emissions were observed between 300 and 500C. Substantial emissions occurred as low as 100C and as high as 800C. They were less in air than in N2, indicating that combustion occurred even at comparatively low temperatures where the fixed carbon does not burn. Mill scale and blast furnace dust were shown to be the major sources of the organic emissions. These results suggest procedures for recycling the hydrocarbon-bearing gases through the hot sinter bed to produce complete combustion and for thermally pretreating the offending components.

PB83-117366 PC **A11**/MF **A01**
Radian Corp., Austin, TX.
Acid Rain Mitigation Study. Volume II. FGD Cost Estimates (Appendices).
Final rept. Feb 80-Feb 81,
J. G. Ball, and W. R. Menzies. Sep 82, 228p RAD-81-203-001-12-23, EPA-600/2-82-070B
Contract EPA-68-02-3171
See also Volume 1, PB83-101329.

The report gives results of work to provide a consistent set of capital investment and operating costs for flue gas desulfurization (FGD) systems retrofitted to existing industrial boilers. The investigation of wet limestone scrubbers and lime spray drying FGD systems included: (1) the apparent discontinuities in both FGD system capital investment and operating costs; (2) FGD retrofit factors applied to existing boilers based on published reports; and (3) differences between PEDCo Environmental, Inc. and TVA cost estimates for utility boiler FGD systems. These costing issues were examined on the bases of design scope, costing factors (for equipment installation, indirect investment, etc.), year of costs, inherent strengths and weaknesses, and published data of actual system costs. Recommendations are made for the cost bases to use in further acid rain studies.

PB83-117390 PC **A07**/MF **A01**
Battelle Columbus Labs., OH.
Improved Leak-Repair Methods: Engineering Design Phase.
Final rept. Jan 81-Jan 82,
R. B. Smith, B. M. Bartilson, R. J. Geoghegan, D. A. Easter, and D. Carter. Jan 82, 128p GRI-80/0135
Contract GRI-5080-353-0410

Engineering designs were developed for three gas pipe leak-repair concepts: an internal epoxy spraying device; an external clamp; and a heat shrink sleeve with a flexible heater blanket. These techniques are intended for the repair of leaks in steel and cast iron pipelines 4 to 12 inches in diameter, and are designed to be performed without disrupting service to gas customers.

PB83-800441 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Financing Urban Transportation: Local Studies. 1970-September 1982 (Citations from the NTIS Data Base).
Oct 82, 245p
Supersedes PB81-807877 and PB80-809437.

The financing of urban transportation in local areas is documented. Although these studies may be of interest to a number of metropolitan localities, they were originally prepared to study the fiscal planning of transit and travel systems for specific areas. Cities covered include Atlanta, New York City, Washington, D.C., Philadelphia, Houston, Baltimore, San Francisco, Minneapolis, Milwaukee, and many smaller localities. Among the systems involved are rapid transit rail, bus, shared taxicab, dial-a-bus, dial-a-ride, and subway. Some attention is given to metropolitan airports. (This updated bibliography contains 239 citations, 27 of which are new entries to the previous edition.)

PB83-800771 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Flexible Highway Pavements. September, 1979-August, 1982 (Citations from the NTIS Data Base).
Oct 82, 270p
Supersedes PB82-802794 and PB80-814502.

Flexible pavement construction, construction materials, and mechanical properties of flexible pavements are investigated in these reports. (This updated bibliography contains 262 citations, 66 of which are new entries to the previous edition.)

PB83-800797 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Guideway Transportation. 1979-September, 1982 (Citations from the NTIS Data Base).
Oct 82, 164p
Supersedes PB81-807869 and PB80-808124.

The bibliography cites research on automated guideway transportation (AGT), in which passengers can be transported along tubes or rails under automatic control. The carriers, termed personal rapid transit vehicles or people movers, can accommodate individuals or small or larger groups. The reports cover many aspects of technology, such as demand actuated service, networks, elevated structures, monorail, light rail, computer aided control, vehicle merging, headway safety, shuttle loops, guideway designs, magnetic levitation, suspended vehicles, and dual mode. Discussions are made of steering control, ride quality, airport services to move people or baggage, gravity assistance in accelerating and braking, test vehicles, and maintenance. Other topics are cost comparisons of AGT with conventional transit, fares, and equipment failure. Air cushion vehicles are excluded. (This updated bibliography contains 156 citations, 42 of which are new entries to the previous edition.)

PB83-800805 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Guideway Transportation. 1964-1978 (Citations from the NTIS Data Base).
Oct 82, 184p

The bibliography cites research on automated guideway transportation (AGT), in which passengers can be transported along tubes or rails under automatic control. The carriers, termed personal rapid transit vehicles or people movers, can accommodate individuals or small or larger groups. The reports cover many aspects of technology, such as demand actuated service, networks, elevated structures, monorail, light rail, computer aided control, vehicle merging, headway safety, shuttle loops, guideway designs, magnetic levitation, suspended vehicles, and dual mode. Discussions are made of steering control, ride quality, airport services to move people or baggage, gravity assistance in accelerating and braking, test vehicles, and maintenance. Other topics are cost comparisons of AGT with conventional transit, fares, and equipment failure. Air cushion vehicles are excluded. (This bibliography contains 178 citations, none of which are new entries to the previous edition.)

PB83-852053 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Vehicular Traffic Control. June, 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 168p
Supersedes PB80-857113.

This bibliography contains citations concerning the design, development, and applications, of vehicle traffic control equipment and systems. Among the systems described are automatic vehicle identifiers for traffic management, urban traffic control systems for the reduction of indirect sources of air pollution, and other automatic vehicle location devices and systems. (This updated bibliography contains 130 citations, 106 of which are new entries to the previous edition.)

PB83-852301 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Disaster Prevention for Offshore Structures. June, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 267p
Supersedes PB82-857632.

This bibliography contains citations concerning the techniques and technology related to the dynamic and static behavior of offshore structures with respect to their stability and durability. Also considered are fatigue and failure analyses for the prevention of disasters. (This updated bibliography contains 285 citations, 28 of which are new entries to the previous edition.)

13C. Construction Equipment Materials, and Supplies

DE82015244 MF **A01**
Brookhaven National Lab., Upton, NY.
Historical Development of Polymer Concrete.
J. J. Fontana. Dec 81, 26p BNL-31096, CONF-811246-1
Contract AC02-76CH00016
National conference on polymeric materials and their applications, Trinandrum, Kerala State, India, 28 Dec 1981, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

PC (polymer concrete) consists of an aggregate mixed with a monomer which is subsequently polymerized in situ. The techniques used for mixing and placement are similar to those used for PCC (Portland cement concrete), and after curing, a high-strength durable material is produced. The most important process variables are types of monomer and aggregate species, size, and size distribution. Composites can be produced with compressive strengths up to approx. 200 MPa. Full strength is attained immediately after the polymerization reaction is complete (1 to 24 hr). Polymerization can be accomplished using initiators in conjunction with promoters and/or heat.

NUREG/CR-2920 PC **A06**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Structural Engineering.
Behavior of Reinforced Concrete Slabs Subjected to Combined Punching Shear and Biaxial Tension.
Technical rept.,
W. C. Jau, R. N. White, and P. Gergely. Sep 82, 104p

This report summarizes experimental results on peripheral (punching) shear strength of precracked, biaxially tensioned, orthogonally reinforced concrete slabs. The 6 inch thick, 4 foot square test specimens were designed to simulate the stress state in the wall of a pressurized containment vessel subjected to combined internal pressurization (which produces biaxial tension) and punching loads normal to the wall. Seven specimens were tested to study the influence of level of biaxial tension, shear span, size of loaded area, and reinforcing ratio on punching shear strength. The levels of biaxial tension, 0 and 0.8f sub y, were used.

PB83-110106 PC **A06**/MF **A01**
Purdue Univ., Lafayette, IN. Joint Highway Research Project.
Stabilization of Three Typical Indiana Aggregates Using Foamed Asphalt.
Interim rept.,
Luis Humberto Castedo Franco, and Robert L. Shofstall. 17 Nov 81, 110p JHRP-81-19, FHWA/IN/JHRP-81/19
Sponsored in part by Indiana Dept. of Highways, Indianapolis.

In this laboratory study, the effects of different factors on the properties of foamed asphalt mixtures were investigated. This laboratory study was also concerned with the development of a design procedure for foamed asphalt mixtures and the feasibility of stabilizing three typical Indiana Aggregates using foamed asphalt. The variables studied were three levels of foamed asphalt content, three levels of moisture content, three curing periods, two levels of test tempera-

ture and three levels of mixing temperature. The foamed asphalt mixtures investigated in this study produced satisfactory cured strength but were susceptible to water damage. It appears that foamed asphalt can be used as a stabilization agent when adequate drainage and sealing are provided. A design procedure for foamed asphalt mixtures was recommended from the findings of this laboratory investigation.

PB83-110916 PC **A09**/MF **A01**
Norges Tekniske Hoegskole, Trondheim. Forskningsinstitutet for Cement og Betong.
Foredrag ved FCB's Informasjonsdag 1981 (Lectures at the 1981 Information Day of the Cement and Concrete Research Institute).
1981, 177p
Text in Norwegian.Also pub. as Norges Tekniske Hoegskole, Trondheim. Selskapet for Industriell og Teknisk Forskning rept. no. STF65-A81055.

The information day of the Cement and Concrete Research Institute (FCB) of the Norwegian Institute of Technology is arranged each year to coincide with the Norwegian Concrete Day in a joint arrangement. It is the FCB's aim, through this arrangement, to expand its contacts with professional people working in concrete in the planning, performance and inspection fields. The report contains the lectures which were given by people from the FCB on the FCB, its organization, financing and research, silica in concrete, the tendency to crack because of drying out prematurely, checking the condition of marine structures, analyses for evaluating the quality of hardened concrete, frostproof concrete, punching holes in concrete slabs, determining dimensions with electronic data processing, determining dimensions by means of tests, anchoring reinforcement, the oscillation of antenna masts and concrete structures and heat. Bibliographies accompany some of the texts of the lectures.

PB83-110924 PC **A06**/MF **A01**
Norges Tekniske Hoegskole, Trondheim. Forskningsinstitutet for Cement og Betong.
Dimensjonering ved Proeving - Gjennomlokningskapasitet av Kontinuerlige Betongplater. Feltforsoek og Laboratorieforsoek (Determining Dimensions by Tests; Punched-Hole Capacity of Continuous Concrete Slabs; Field and Laboratory Experiments),
P. K. Ekeberg, and A. Sjursen. Apr 81, 119p
Text in Norwegian.Also pub. as Norges Tekniske Hoegskole, Trondheim. Selskapet for Industriell og Teknisk Forskning rept. no. STF65-A81024.

Experiments in punching holes in continuous concrete slabs were carried out in a warehouse and on the surface of a quay. The solidity of the concrete and the reinforcement were measured, and the location of the reinforcement and the thickness of the surface were recorded. The results of the experiments on continuous surfaces revealed high breaking loads in proportion to the calculated values yielded by the usual methods of determining dimensions. Field experiments were supplemented by some laboratory experiments. Comparison of the breaking loads in the warehouse and the laboratory show that the fastening of the sides of the slabs in the continuous surface in the warehouse provided a doubling of the breaking load by comparison with a loosely stored slab. A bibliography, numerous drawings and 16 photographs are included.

PB83-111831 PC**$27.00**/MF**$27.00**
Construction Industry Research and Information Association, London (England).
Formwork Striking Times - Methods of Assessment,
T. A. Harrison. Oct 77, 43p CIRIA-73, ISBN-086017-032-2
Also pub. in ISSN-0306-3267.

The report first examines the criteria governing the striking time of formwork. Alternative methods of determining the concrete strength required for striking are given. The factors affecting gain of strength of in-situ concrete are discussed, and methods of determining striking time are compared. An appendix discusses the concrete strength required for a structure to withstand wind loading shortly after removal of formwork.

PB83-111849 PC**$72.00**/MF**$72.00**
Construction Industry Research and Information Association, London (England).
Lack of Fit in Steel Structures,
A. P. Mann, and L. J. Morris. c1981, 68p CIRIA-87, ISBN-0-86017-144-2
Also pub. in ISSN-0305-408X.

Various forms of lack of fit may be experienced in the fabrication and erection of a steel structure. From a comprehensive survey of fabricators, consultants and local authorities, it was possible to identify the principal causes of lack of fit, especially where these resulted in disagreement. Guidance is given on the significance of various forms of geometrical imperfection. In particular the behavior of friction grip and bearing bolt, and welded connections has been studied, together with overall frame fit problems.

PB83-111872 PC**$72.00**/MF**$72.00**
Construction Industry Research and Information Association, London (England).
Behaviour of Reinforced Concrete Flat Slabs,
P. E. Regan. c1981, 93p CIRIA-89, ISBN-0-86017-150-7
Also pub. in ISSN-0305-408X.

The design of reinforced concrete flat slabs is studied with regard to flexure, punching shear, and deflection. The basis of the project was a comprehensive experimental program of slab tests to failure. Design expressions are developed to take account of the equivalent beam behavior of the slab, and the reduction in effective slab width close to exterior columns. Detailing procedures are presented which reflect the distribution of slab moments and torsion local to the columns.

PB83-111880 PC**$45.00**/MF**$45.00**
Construction Industry Research and Information Association, London (England).
Rolled Concrete for Dams: A Resume of Laboratory and Site Studies of High Flyash Content Concrete,
M. R. H. Dunstan. c1981, 66p CIRIA-90, ISBN-0-86017-158-2
Also pub. in ISSN-0305-408X.

An extensive review was made of the various construction methods which have been proposed for rolled concrete dams. Three main types of material were found to be under consideration: lean concrete, cement-stabilized 'as dug' material, and high flyash content concrete. From the review, it was concluded that there would be technical and economic advantages in using concrete with a high flyash content for the hearting, which should be compacted by vibratory roller and retained within facings which are slipformed horizontally. A considerable number of mixes was tested, and relationships derived between water/cementitious ratio and compressive strength, tensile strength, tensile modulus, and tensile strain capacity. The properties of high flyash content concrete compare favorably with those expected from conventional mixes.

PB83-111898 PC**$45.00**/MF**$45.00**
Construction Industry Research and Information Association, London (England).
Early-Age Thermal Crack Control in Concrete,
T. A. Harrison. c1981, 52p CIRIA-91, ISBN-0-86017-166-3
Also pub. in ISSN-0305-408X.

Early-age thermal cracking occurs when the restrained thermal contraction strain exceeds the tensile strain capacity of the concrete. The restraint to thermal movement is the product of the coefficient of thermal expansion of the concrete, the temperature fall from a peak level during cement hydration, and a restraint factor. This report discusses each of these factors in turn, and shows how early-age thermal strains can be reduced by taking appropriate measures during the design and construction of reinforced concrete elements. The concrete temperature rise is shown to depend on a number of factors: cement content, type of aggregate, possible use of cement replacement materials, as well as ambient temperature, formwork used and section thickness. Restraint is a function of the construction sequence and the constraint of neighbouring elements. If early-age thermal cracking cannot be prevented, crack widths can be controlled with reinforcement.

PB83-111914 PC**$45.00**/MF**$45.00**
Construction Industry Research and Information Association, London (England).
Review of Field and Laboratory Tests on Riprap,
J. D. Pitt, and P. Ackers. c1982, 25p CIRIA-94, ISBN-0-86017-184-1
Also pub. in ISSN-0305-408X.

Two earlier documents (CIRIA Technical Note 101 and Hydraulics Research Station Report IT213) are reviewed with regard to design implications. Both the extent of agreement and anomalies in behavior between the field and laboratory tests in these publications are discussed in relation to model effects and scale effects.

PB83-111922 PC**$20.00**/MF**$20.00**
Construction Industry Research and Information Association, London (England).
Tables of Minimum Striking Times for Soffit and Vertical Formwork,
T. A. Harrison. Mar 79, 29p CIRIA-67, ISBN-0-86017-124-8
Also pub. in ISSN-0305-408X.

Times for the removal of soffit and vertical formwork are given in tabular form. These relate to five grades of concrete containing ordinary or rapid hardening Portland cement and a range of concrete placing and ambient temperatures. The tables are preceded by explanatory notes on their derivation and examples of their use.

PB83-113951 PC **A08**/MF **A01**
Indian Standards Institution, New Delhi.
Explanatory Handbook on Masonry Code.
c1981, 160p SP:20(S-T)-1981
Errata sheet inserted.

This handbook is in two parts: Part 1 is the reproduction of Part VI Structural Design, Section 4 Masonry of the National Building Code of India 1970, and Part 2 provides commentary on various clauses of the Masonry Code. The commentary provides explanations for the background and choice of some of the requirements, draws attention to suitable references for elaboration of the code requirements, includes design aids in the form of tables and charts, gives typical illustrative examples using codal provisions, and helps in interpretations of the code. The handbook, it is hoped, would make available the needed guidance to the practicing engineers in the field of structural masonry to effect economy in cost of construction.

PB83-852061 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Conveyor Systems. February, 1974-October, 1982 (Citations from the NTIS Data Base).
Rept. for Feb 74-Oct 82.
Oct 82, 293p
Supersedes PB80-856180.

This bibliography contains citations concerning conveyor system technology. Design and construction of various types of conveyor systems currently in use are presented. Among the systems discussed are belt, bucket, chain, hydraulic, and pneumatic conveyors, with consideration given to their industrial and military applications. Included are federal regulations and standards. (This updated bibliography contains 237 citations, 37 of which are new entries to the previous edition.)

PB83-852137 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Conveyor Systems. June, 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for Jun 76-Oct 82.
Oct 82, 261p
Supersedes PB80-856214.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning conveyor system technology. Conveyor systems for loading coke ovens, cross-pit conveyors for continuous mining systems, large scale conveyors for power plant applications, and safety awareness programs for conveyor system and belt maintenance are among the topics discussed. Performance tests, operational systems worldwide, and performance evaluations are included. (This updated bibliography contains 279 citations, 79 of which are new entries to the previous edition.)

PB83-852145 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Conveyor Systems. August, 1977-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Aug 77-Oct 82.
Oct 82, 216p
Supersedes PB80-856198.

This bibliography contains citations concerning conveyor system technology. Screw conveyors, vertical double belt conveyors and cross-pit conveyor systems are among the designs discussed relative to such applications as coal mining, open-pit mining, manufacturing and agriculture. Performance design problems, capacities, statistical testing, and power plants for driving the conveyor systems are included. (This updated bibliography contains 243 citations, 43 of which are new entries to the previous edition.)

13D. Containers and Packaging

N82-31725/6 PC **A07**/MF **A01**
Oxford Univ. (England). Dept. of Engineering Science.
On the Behaviour of Open Topped Oil Storage Tanks in High Wind.
R. J. Holyroyd. Apr 82, 140p OUEL-1405/82

Measurements of the wind induced pressure loading on a scale model of a storage tank are reported for empty and full tank. For the empty tank it is shown that the mean component of the wind load induces deflections of the shell smaller than its minimum plate thickness. Mean wind load alone is insufficient to cause catastrophic collapse of the tank although the position of maximum deflection might act as a trigger for a mode of failure comprising a (part) circumferential band of wrinkles below the rim. For the full tank, it is shown that the tilt of the roof due to the mean component of the wind load is insufficient to cause it to buckle. From an analysis of an idealized mathematical model of the roof, expressions are derived for its natural frequencies and other modal parameters.

13E. Couplings, Fittings, Fasteners, and Joints

N82-31690/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Cam Controlled Retractable Door Latch.
R. B. Carsley. 30 Jun 82, 11p US-PATENT-APPL-SN-393585, NASA-CASE-MSC-20304-1
Sponsored by NASA.

A latching mechanism in which there is linear movement and rotational movement is described. The umbilical doors of the space shuttle orbiter are required to be open during vehicle launch. After the external tank is released, the doors are closed. Presently, the device for maintaining the doors in an open position is mounted on the external tank and therefore has a single mission life. The latching mechanism of the invention is mounted in the orbiter and therefore is returned and has multimission capability. The latching mechanism is comprised of a pair of concentric nested, cylindrical cams and motors to actuate the cams, and latch pin all contained within a cover mounted on a support bracket carried by the substructure. A shaft having a latch pin is mounted inside the inner cylindrical cam.

PAT-APPL-6-387 646 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Self-Locking Mechanical Center Joint.
Patent Application,
H. G. Bush, and R. E. Wallsom. Filed 11 Jun 82, 16p N82-29606/2, NASA-CASE-LAR-12864-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A device for connecting, rotating and locking together a pair of structural half-columns is described. The present embodiment comprises a pair of cylindrical hub assemblies connected at their inner faces by a spring loaded hinge; each hub assembly as a structural half column attached to its outer end. Each hub assembly includes a cylindrical hub and a locking ring moveably attached around the hub's hinged end. Each locking ring has a plurality of 'L' shaped teeth projecting outward perpendicularly from its circumference and is attached around the hub subject to the force of a spring connected to both the ring and hub. Each cylindrical hub has a latch mechanism for holding each locking ring in a rotated position against the force of the spring and a hammer mechanism for disenagaging the latch mechanism on the opposing hub when the hubs are rotated together. The structural half columns connected to the hinged pair of hub assemblies are stored so that the hub assemblies are rotated away from each other and are subject to the force of their spring loaded hinge.

13F. Ground Transportation Equipment

AD-A119 513/0 PC **A12**/MF **A01**
Coordinating Research Council, Inc., Atlanta, GA.
1981 CRC Octane Number Requirement Survey.
Aug 82, 265p Rept no. CRC-525
Contract DAAK70-81-C-0128

In the 35th annual statistical survey of current model vehicles conducted by the Coordinating Research Council, Inc., test data were obtained on 429 1981 model vehicles, including nine select models of special interest. Maximum octane number requirements at either full- or part-throttle operating conditions were determined. Included also are the octane number requirements as determined by the new 50th percentile acceleration technique designed to more nearly represent customer-type driving. Surface ignition and rumble, if present, were also reported. Passenger cars and light-duty trucks including non-commercial vans (1/2-3/4 ton without four-wheel drive) were tested according to a weighted distribution. This years's Survey includes analyses of validated data for the following vehicle categories: US and Imported Vehicles -- 417 vehicles; US and Imported Cars -- 392 cars; US Vehicles -- 318 vehicles; US Cars--300 cars, and Imported Vehicles--99 vehicles.

AD-A119 541/1 PC **A03**/MF **A01**
Army Mobility Equipment Research and Development Command, Fort Belvoir, VA.
Verification Tests of the South Coast Technology Electric VW Rabbit Pickup Truck.
Verification test rept. 20 Sep-16 Oct 81,
Edward J. Dowgiallo, Jr., and Robert D. Chapman.
Apr 82, 40p Rept no. MERADCOM-2359
Contract EC-77-A-31-1042

The South Coast Technology Electric is a standard VW Rabbit pickup truck that has been converted to an electric vehicle. It is powered by 18 6-V batteries connected in series through a transistorized field chopper controller to a 24-hp shunt-wound d.c. motor. It has a 4-speed manual transmission, disc brakes in front, drum brakes in the rear, and regenerative decelleration. It comes with an off-board 230-V a.c. charger with a 30-A maximum current rating. (Author)

DE82013331 MF **A01**
Jet Propulsion Lab., Pasadena, CA.
DOE ETV-1 Electric Test Vehicle. Phase III: Performance Testing and System Evaluation. Final Report.
D. W. Kurtz. Dec 81, 78p DOE/CS/54209-T2, JPL-PUB-81-93
Contract AI01-78CS54209
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The DOE ETV-1 represents the most advanced electric vehicle in operation today. Engineering tests have been conducted by the Jet Propulsion Laboratory in order to characterize its overall system performance and component efficiencies within the system environment. A dynamometer was used in order to minimize the ambient effects and large uncertainties present in track testing. Extensive test requirements have been defined and procedures were carefully controlled in order to maintain a high degree of credibility. Limited track testing was performed in order to corroborate the dynamometer results. Test results include an energy flow analysis through the major subsystems and incorporate and aerodynamic and rolling losses under cyclic and various steady speed conditions. A complete summary of the major output from all relevant dynamometer and track tests is also included as an appendix.

DE82014342 MF **A01**
Kansas Energy Office, Topeka.
Kansvan: An Energy and Money Saving Vanpooling Program for All Kansans.
J. Fishbein. 1981, 26p DOE/AF/93013-T3
Contract FG47-81AF93013
Best available copy from document source. Available in microfiche only.

The purpose of the manual is to acquaint employees and managers of Kansas businesses with the concept and operation of a vanpooling program. The procedure for organizing a vanpooling program is described. Six employer-based vanpool programs in Kansas are briefly summarized.

N82-31817/1 PC **A15**/MF **A01**
Technische Hochschule, Aachen (Germany, F.R.). Verkehrswissenschaftliches Inst.
Specific Energy Use in Traffic. Determination and Comparison of Specific Energy Consumptions. Volume 1: Text Spezifischer Energieensatz im Verkehr Ermittlung und Vergleich der Spezifischen Energieverbraeuche.
Final Report.
W. Schwanhaeusser, B. Golling, W. Simon, H. C. Roesgen, and W. Nicoll. Jul 81, 327p FE-82007/80-V-L-1
Text in German. Sponsored by Bundesministers fuer Verkehr.

The specific energy use by traffic in the Federal Republic of Germany was investigated by refined technical-physical calculation methods. All energetically important influence factors and their interactions were studied, resulting in the calculation model MICSIM. Results were converted into primary energy consumption values. One hundred and twenty seven representative means of transportation were investigated, covering the whole spectrum of the most important modern means of transportation.

N82-31818/9 PC **A10**/MF **A01**
Technische Hochschule, Aachen (Germany, F.R.). Verkehrswissenschaftliches Inst.
Specific Energy Use in Traffic. Determination and Comparison of Specific Energy Consumptions. Volume 2: Tables Spezifischer Energieeinsatz im Verkehr Ermittlung und Vergleich der Spezifischen Energieverbraeuche.
W. Schwanhaeusser. 1981, 221p FE-82007/80-V-L-2
Text in German.

The specific energy use by traffic in the Federal Republic of Germany was investigated using refined technical physical calculation methods. All energetically important influence factors and their interactions were systematically studied, resulting in the calculation model MICSIM. Results were converted into primary consumption values. In all, 127 representative means of transportation were investigated, covering the whole spectrum of the most important modern means of transportation.

N82-31819/7 PC **A08**
Stuttgart Univ. (Germany, F.R.). Abt. Reaktorsicherheit und Umwelt.
Alternative Development Possibilities of the Transportation Energy Demand in Baden-Wuerttemberg, West Germany Alternative Entwicklungsmoeglichkeiten des Energiebedarfs im Bereich Verkehr in Baden-Wuerttemberg.
Ph.D. Thesis.
T. Levan. Aug 81, 156p IKE-K-54-7, ISSN-0173-6892
Text in German.

The development possibilities of the transportation energy demand in Baden-Wuerttemberg were qualitatively and quantitatively investigated using a traffic model, in order to serve as a basis for transportation strategy and structuring. The traffic model was set up using established hypothetical interactions and statistical data on traffic. In order to quantize the model equations regression analysis was used. The impact of technological and economic developments on traffic and energy demand is discussed.

PB83-110114 PC **A03**/MF **A01**
Federal Railroad Administration, Pueblo, CO. Transportation Test Center.
Observations of In-Service Wear of Railroad Wheels and Rails under Conditions of Widely Varying Lubrication.
Interim rept.,
Roger K. Steele. Jul 82, 40p FRA/TTC-82/05
Sponsored in part by Association of American Railroads, Washington, DC. and Railway Progress Inst., Alexandria, VA.

Some of the wheel and rail wear results from the current test at the Facility for Accelerated Service Testing are analyzed in the light of both adhesive and fatigue wear theories. This analysis suggests that the wheel/rail wear processes occurring in the unlubricated state are affected by more than one wear mechanism. Increases in the hardness of one component may cause an increase or decrease in the wear rate of the mating component. Which alternative does occur appears to be related to the mechanism of wear, the magnitude of the change in hardness, and the relative change in the wear rate of the component changed in hardness. A metallurgy/lubrication interaction that has been observed to occur when lubrication is applied had been found to be consistent with a concept of friction-dependent alteration of surface contact stresses when modified by the inclusion of a material sensitive parameter, i.e., hardness.

PB83-111633 PC **A05**/MF **A01**
Pennsylvania Transportation Inst., University Park.
Tire Energy Dissipation Determination.
Final rept. 29 Sep 78-29 Sep 79,
Gordon F. Hayhoe. Jul 82, 85p PTI-8212
Contract EPA-63-03-2763

The design and development of a machine to measure tire energy dissipation over transient driving cycles is described. The main feature of the machine is that two tires are loaded against each other across a steel belt which runs on 762-mm diameter steel drums. One of the wheels is driven to follow a transient driving cycle representative of typical passenger car use; the other wheel is allowed to roll freely. Energy dissipation in the driving tire is measured by subtracting the energy leaving the tire from the energy entering the tire. An error, ascribed to small deformations of the belt in the tire contact area, was found in the tire energy measurement. This error is a function of the construction of the tires installed on the machine. A number of modifications to the machine and the test procedures are suggested to improve the accuracy of the energy dissipation measurements. Typical energy dissipation measurements for C-14 tires are presented.

PB83-112540 PC **A08**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Small Transit Vehicles: State-of-the-Art Overview.
Aug 81, 153p DOT-TSC-OST-81-6

This 141-page report presents information on the small transit vehicles available, and on the selection, procurement, and operational considerations of using such small buses in a transportation service. Appendices cover manufacture of vehicles and lifts, vehicle inspection and maintenance forms, technical specifications, and life-cycle costing. The report is intended for providers, and life-cycle costing. The report is intended for providers of services, and community and state transit planners.

PB83-112789 PC **A04**/MF **A01**
Tri-County Metropolitan Transportation District of Oregon, Portland.
Noise Reduction Retrofit for a 'New Look' GMC Transit Bus: Service Bulletin.
Final rept. Apr 80-Nov 81,
Michael C. Kaye. Nov 81, 64p UMTA-OR-06-0005-81-1
Contract UMTA-OR-06-0005
Sponsored in part by Environmental Protection Agency, Washington, DC. Office of Noise Abatement and Control. See also PB80-226103.

This document gives instructions on how to apply a noise treatment to a contemporary city transit bus without extensive structural alteration. Prototype anti-noise treatments of two conventional transit motorbuses were tested: a Flexible 'New Look' and a GMC 'New Look' model. Baseline bus configuration, noise ratings, and performance benchmarks are presented for a GMC model T8H-5307A transit bus, powered by a Detroit Diesel 8V-71N engine. Earlier, a Flxible model 111DC-D061 was similarly treated using the same concepts and much of the same hardware. The results are almost identical, showing the wide range of treatment applicability. This report gives instructions as to how GMC 'New Look' model is retrofitted with a turbocharged 8V-71TAC engine and ancillary hardware. The instructions include the revision of the engine aspiration system for easier breathing, the lining of the engine compartment with an anti-noise blanket, and the silencing of the hiss of the compressed air system dryer.

PB83-114322 PC **A08**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Transit Bus Manufacturer Profiles.
Technical rept. (Final),
B. Weiers, and M. Rossetti. Mar 82, 171p DOT-TSC-UM262-PM-82-13, UMTA-MA-06-0120-82-3
Grant DOT-UMTA-MA-06-0120
See also PB83-114330.

The purpose of this report is to present information on the structure and history of the U.S. transit bus manufacturing industry with a minimum of analysis. How buses are categorized and the relationship of transit buses to other types of buses are described. The structure of the transit bus industry and its relationship to the larger motor vehicle industry is also described. The history of the transit bus manufacturing industry is presented from production of the first buses at the turn of the century to the present day. The entry and exit of firms from the industry, the development of the Urban Mass Transportation Administration, and the introduction of the advanced design buses are highlighted. This document also discusses profiles of individual manufacturers. The United States and Canadian builders of standard and articulated transit buses are each profiled. Several foreign and domestic companies which have expressed an interest in the industry have also been included.

PB83-114330 PC **A07**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Technology of Articulated Transit Buses.
Technical rept. (Final),
Richard G. Gundersen. Mar 82, 136p DOT-TSC-UM262-PM-82-14, UMTA-MA-06-0120-82-4
Grant DOT-UMTA-MA-06-0120
See also PB83-114322.

Since the first major demonstration of articulated buses in the mid 1970s and the first purchase in late 1978, interest in articulated buses in U.S. transit service has remained strong. This interest has been stimulated by the desire of public transit agencies to increase passenger capacity, improve productivity, and reduce or at least maintain operating costs. Further, the interest is evidenced by the delivery and deployment of over 500 articulated buses to 14 cities and a current backorder of approximately 700 units for a total capital investment of over $300 million. This study was conducted to provide technical assistance to urban transit managers and state DOTs for use in their analyses and decision-making related to the deployment of articulated buses. Operational and maintenance experiences were obtained from each U.S. property currently using these vehicles. In addition, technical design and performance information was obtained from U.S. producers and numerous foreign articulated bus manufacturers. The information contained in this report addresses three major aspects of these high-capacity buses: (1) status of deployment of articulated transit coaches in this country; (2) a description of the design and technology of commercially-available articulated buses, both foreign and domestically produced; and (3) a general review of the current domestic operating and maintenance background of the articulated buses. In general, this report provides status information on articulated bus technology and its performance, to date, in domestic service.

PB83-851659 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Traction Drive Transmissions. June, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 61p
Supersedes PB80-857931.

This bibliography contains citations concerning the technology of replacing gear and fluid transmissions with traction drive transmissions which have continuously variable ratios. Developments and innovations of traction drive systems in ground vehicles are discussed. Current projects, efficiency of operation, and mechanical performance evaluations are included. (This updated bibliography contains 62 citations, 42 of which are new entries to the previous edition.)

PB83-851782 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electric Automobiles. September, 1978-October, 1982 (Citations from the Energy Data Base).
Rept. for Sep 78-Oct 82.
Oct 82, 268p
Supersedes PB80-857188.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning the research and development of the electric automobile. Various sources of energy to accomodate electric cars, environmental effects, energy consumption and efficiency, and computer simulation and modelling relative to electric vehicle transportation are considered. Design variations are also included. (This updated bibliography contains 283 citations, 96 of which are new entries to the previous edition.)

PB83-852368 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Auto and Truck Suspension Systems. June, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 213p
Supersedes PB82-857251.

This bibliography contains citations concerning the effect of suspension systems on the performance of motor vehicles. Topics include shock absorbers, steering stability, and load leveling, as well as the characteristics of both leaf and coil springs. Materials considerations such as fatigue and wear are also discussed. (This updated bibliography contains 248 citations, 22 of which are new entries to the previous edition.)

13H. Industrial Processes

AD-A119 615/3 PC **A10**/MF **A01**
Army Industrial Base Engineering Activity, Rock Island, IL.
Manufacturing Methods and Technology Project Summary Reports.
Semi-annual rept. Jan-Jun 82.
Jun 82, 225p

This report contains summaries of 95 projects that were completed under the Army's Manufacturing Methods and Technology (MMT) Program. The MMT program was established to upgrade manufacturing facilities used for the production of Army Materiel. The summaries highlight the accomplishments and benefits of the projects and the implementation actions underway or planned. Points of contact are also provided for those who are interested in obtaining additional information. (Author)

AD-A119 641/9 Not available NTIS
Illinois Univ. at Urbana-Champaign. Dept. of Electrical Engineering.
Discharge Annealing of Ion Implanted Silicon,
C. B. Fleddermann, N. J. Ianno, J. T. Verdeyen, and B. G. Streetman. 1982, 7p ARO-16849.20-EL
Contracts DAAG29-80-C-0011, N00014-79-C-0424
Availability: Pub. in Laser and Electron-Beam Interactions with Solids, p795-800 1982 (No copies furnished by DTIc/NTIS).

No abstract available.

AD-A119 651/8 PC **A02**/MF **A01**
Army Armament Research and Development Command, Watervliet, NY. Large Caliber Weapon Systems Lab.
MM&T: Improved Tube Straightening.
Final technical rept.
1 Sep 82, 14p

The pressing or straightening of gun tubes is a difficult and tedious operation. There are no set guidelines that

can be applied to assist the operator in pressing a gun tube. It is impossible to predict how much each individual gun tube will have to be pressed in order to straighten it to acceptable limits. Due to these conditions it introduces a measure of tension or strain on the operator. Any input that would give greater control which would induce more operator confidence would be of benefit to both operator efficiency and process improvement. The application of digital readout equipment for pressing gun tubes has proved the feasibility of the system as a superior and more accurate and reliable process than current methods. Without question, once learned and understood, the system will show itself to be very basic, simple to operate and easily adaptable. The system requires little care and with proper attention it should provide long and reliable service. The test and evaluation period, during which fifty-three (53) gun tubes of different sizes were successfully pressed without difficulty, has proven the system adaptable to production application.

AD-A119 652/6 PC **A03**/MF **A01**
Army Armament Research and Development Command, Watervliet, NY. Large Caliber Weapon Systems Lab.
MM&T: Material Handling.
Final technical rept.
1 Sep 82, 47p

The movement of gun tubes which are large (12 in. dia.), long (20 feet), and heavy (up to 4 tons), through the shops as well as positioning the pieces in machines for metal removal presents an unusual and difficult material handling problem. In 1975, the Watervliet Arsenal MM&T project 6717042 'End Item Manufacturing Guide' included a report prepared by RCC Inc. This report indicated that the move time for gun tubes was determined to be 12% of the total time spent in manufacturing a gun tube. It was felt that this percentage of time could be cut in half by using properly selected material handling systems and equipment. With the 'REARM' program occurring this was the ideal time for modernizing the material handling procedures.

AD-A119 690/6 PC **A02**/MF **A01**
Army Armament Research and Development Command, Watervliet, NY. Large Caliber Weapon Systems Lab.
Application of Cold and Warm Rotary Forging.
Final technical rept.
1 Sep 82, 12p

Hot forging capabilities of the rotary forging process are recognized and the major forging parameters well defined. However, both warm and cold forging (at ambient temperatures) parameters of alloy steels used for cannon and related components are relatively unknown. Their definition will permit an expansion of the rotary forge machine's capability and utilization toward mission items. The project objective was to extend the capabilities of the Rotary Forge Integrated Line by providing production data for warm and cold forging. It has been demonstrated that cold forging of thin-wall cannon with finished bores (rifled) is feasible by the rotary forge process. A limited number of thin-wall rifled and smooth bores have been forged as a result of the rotary forge machine. The proposed work will draw on the results from these programs to produce thin-wall tubes that meet the drawing requirements. This is the third phase of a three-year MMT effort. With FY77 funding, tooling was procured and the development of processing parameters initiated.

AD-A119 719/3 PC **A10**/MF **A01**
Naval Research Lab., Washington, DC.
The Use of Ion Implantation for Materials Processing.
Annual progress rept. 1 Oct 80-30 Sep 81,
F. A. Smidt. 2 Jul 82, 205p Rept no. NRL-MR-4821

An interdisciplinary program on the use of ion implantation for materials processing is being conducted at NRL. This report describes the important factors in ion implantation science and technology and reports progress in the use of ion implantation to modify wear, fatigue, corrosion, and optical properties of materials. (Author)

AD-A119 810/0 PC **A03**/MF **A01**
McDonnell Aircraft Co., St. Louis, MO.
Ion Vapor Deposition Processing of Armament Parts.
Final rept. 1 Oct 81-30 Jun 82,
J. J. Reilly. 15 Jul 82, 31p
Contract DAAK10-81-R-0325

Over 3,000 armament components are currently electroplated with cadmium. All DoD organizations are committed to replace toxic cadmium wherever feasible. There is an equal need to alleviate the potential for hydrogen embrittlement failures. All electroplate processes introduce hydrogen. IVD aluminum coating per MIL-C-83488 has been identified by MIL-STD-1568 as an acceptable alternate to cadmium on steel stating its non-toxic and corrosion prevention characteristics. The object of the program is to establish IVD aluminum as a viable coating for armament hardware/parts. (Author)

DE82009130 MF **A01**
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Proceedings of the Low-Cost Solar Array Wafering Workshop.
1 Feb 82, 308p DOE/JPL-1012-66, CONF-8106211-
Contract AI01-76ET20356
Low-cost solar array wafering workshop, Phoenix, AZ, Ukrainian SSR, 8 Jun 1981, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Separate abstracts were prepared for 25 papers in these proceedings. Also included in the conference proceedings are two keynote addresses. (ERA citation 07:046192)

DE82011188 PC **A02**/MF **A01**
Sandia National Labs., Livermore, CA.
Study of Inertia Welding: The Sensitivity of Weld Configuration and Strength to Variations in Welding Parameters.
M. W. Mote. Dec 81, 23p SAND-81-8029
Contract AC04-76DP00789
Portions of document are illegible.
Microfiche only after original copies are exhausted.

An experiment is described which is designed to demonstrate the forgiveness of inertia welding, that is, the relative insensitivity of weld strength to variations in energy (rotational speed of parts) and axial force. Although easily observed variations in the welding parameters produced easily observed changes in weldment configuration and changes in dimension (upset), only extremes in parameters produced changes in weld strength. Consequently, process monitoring and product inspection would be sufficient for quality assurance in a production environment. (ERA citation 07:044184)

DE82012716 MF **A01**
Wisconsin Univ.-Madison. Dept. of Chemical Engineering.
Operability Measures for Process Design.
M. Morari. 1982, 18p DOE/ER/10645-4, CONF-820362-1
Contract AC02-80ER10645
Symposium on understanding process integration, Lancaster, UK, 1 Mar 1982, Portions of document are illegible.
Available in microfiche only.

Process integration leads to stronger coupling between processing units and potential operating problems become more difficult to detect. Simple operability measures are suggested for an efficient screening of alternate designs. The three-step search procedure for the best design aims at assessing the system inherent limitations to control quality. It starts with rating calculations using nonlinear steady state models. The next step examines the non-minimum phase characteristics in linear transfer matrix models. Finally, the effect of model/plant mismatch on control quality is evaluated. The procedure is efficient and appeals to engineering intuition. Examples involving heat exchanger networks are discussed.

DE82015428 MF **A01**
Bendix Corp., Kansas City, MO.
Effects of Rework on Adhesion of Pb-IN Soldered Gold Thick Films.
R. W. Gehman, G. A. Becka, and J. A. Losure. Feb 82, 8p BDX-613-2714, CONF-820521-3
Contract AC04-76DP00613
32. electronic components conference, San Diego, CA, USA, 10 May 1982.
Best available copy from document source. Available in microfiche only.

The feasibility of repeatedly reworking Pb-In soldered joints on gold thick films was evaluated. Nailhead adhesion tests on soldered thick films typically resulted in failure within the bulk solder (50 In-50 Pb). Average strengths increased with each rework, and the failure mode changed. An increase in metalization lift-off occurred with successive reworks. An investigation was initiated to determine why these changes occurred. Based on this work, the thick film adhesion to the substrate appeared to be lowered by indium reduction of cadmium oxide and by formation of a weak, brittle intermetallic compound, Au sub 9 In sub 4 . It was concluded that two solder reworks could be conducted without significant amounts of metallization lift-off during nailhead testing.

N82-31340/4 PC **A07**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Extraterrestrial Materials Processing.
W. H. Steurer. 15 Apr 82, 147p NAS 1.26:169268, JPL-PUBL-82-41, NASA-CR-169268
Contract NAS7-100

The first year results of a multi-year study of processing extraterrestrial materials for use in space are summarized. Theoretically, there are potential major advantages to be derived from the use of such materials for future space endeavors. The types of known or postulated starting raw materials are described including silicate-rich mixed oxides on the Moon, some asteroids and Mars; free metals in some asteroids and in small quantities in the lunar soil; and probably volatiles like water and CO2 on Mars and some asteroids. Candidate processes for space materials are likely to be significantly different from their terrestrial counterparts largely because of: absence of atmosphere; lack of of readily available working fluids; low- or micro-gravity; no carbon-based fuels; readily available solar energy; and severe constraints on manned intervention. The extraction of metals and oxygen from lunar material by magma electrolysis or by vapor/ion phase separation appears practical.

N82-31341/2 PC **A03**/MF **A01**
Alabama Univ., Huntsville.
Electrodeposition in Microgravity: Ground-Based Experiments.
Final Report, 13 May 1981 - 30 Jun. 1982.
C. Riley, and H. D. Coble. Jun 82, 28p NAS 1.26:162069, NASA-CR-162069
Contract NAS8-33812

Electrodeposition was studied at one-hundreth g and compared with bench studies at 1 g. The low gravity was achieved during KC-135 aircraft parobolic flights. Flow in a simple cobalt cell (1 M CoSO4) operating under typical commercial conditions (10 to 20 mA/sq cm and 1 V) was monitored with a Schlieren optical system. Natural convection was absent at one-hundreth g. Quantitative comparisons on a cobalt cell with shielded electrodes using interferometry were carried out. Fringe shift differences indicate greater semi-infinite linear diffusion at 1 g than at one-hundreth g for cobalt. Since a shielded electrode operates under diffusion controlled conditions, no differences between 1 g and one-hundreth g would be expected. Similar comparisons on a shielded electrode copper cell were inconclusive. Bench codeposition experiments using polystyrene neutral buoyancy particles coupled with a shielded electrode cobalt cell were begun. Tracking of 12 micron particles showed no measurable difference between thermal/Brownian motion when the cell was operational or nonoperational. Initial experiments on codeposition quality showed a strong dependence upon cathode surface preparation in a shielded electrode configuration.

N82-31409/7 PC **A05**/MF **A01**
Fulmer Research Inst. Ltd., Stoke Poges (England).

Guidelines for the Use of Superplastic Forming of Metals in Spacecraft Construction.
A. K. Green. Jan 82, 85p R878/3A, ESA-CR(P)-1586-V-3
Contract ESA-4389/80/NL-AK(SC)

Aerospace uses of superplastically formed parts are reviewed, and commercial sources of superplastic materials and technology in Europe are listed. The opportunities for, and constraints on, component and structural design presented by the use of superplastic forming are outlined. The metallurgical features of superplasticity are described. Superplastic forming processes, i.e., hydraulic bulging, sheet thermoforming, blow molding, forging, deep drawing, dieless drawing, and powder metallurgy processes are discussed. Concurrent superplastic forming and diffusion bonding of titanium alloys is introduced. Zinc-aluminum, aluminum base, and titanium alloys are treated, as are stainless steels and nickel base superalloys.

N82-31570/6 PC **A03**/MF **A01**
Centre de Recherches Scientifiques et Techniques de l'Industrie des Fabrications Metalliques, Brussels (Belgium).
Activities of the Metal Manufacturing Research Center Rapport Annuel du Comite Permanent au Conseil General du 16, Juin 1982.
Annual Report, 1981.
1981, 38p
Text in French.

Research work performed on casting, bridges, frameworks, boilermaking, mechanical construction, computer and automation techniques, and plastic working is summarized. Subjects include computer assisted design and manufacture, industrial robots with video capabilities, cryogenics materials, fatigue behavior of large girders and welding.

N82-31687/8 PC **A03**/MF **A01**
Ishikawajima-Harima Heavy Industries Co. Ltd., Tokyo (Japan).
Welding of al-MG Alloy 5083-0 for the Construction of Lng Storage Tanks.
Y. Kuriyama, K. Minoda, T. Irisawa, and H. Nagaoka.
15 Apr 81, 29p
Sponsored in Part by the Welding Research Inst., Japan Prepared in Cooperation with Shin-Nakahara-Cho, Yokohama, Japan. Presented at the Iiw-Jiw Colloq. Prod. Technol. And Quality Assurance, Nagoya, Japan, 15 Apr. 1981.

Welding processes of 5083-0 thick plates, mechanical properties of the welded joints and measures for the prevention of weld defects, intended mainly LNG tank construction are studied. The followings are the main contents of this article. The welding processes currently applied for assembling large LNG tanks are conventional MIG, high current MIG and DCSP TIG, all of which are fully automated. The principal applications of automatic welding are as follows: (1) high current MIG process done on ground for assembling two to three panels into a block using large diameter (3.2 to approximately 4.8 mm) filler wire, and (2) mechanized all position MIG process for erection welding of the aforementioned blocks of tank shell and for the welding of filler joints of bottom and roof plates.

PB83-107268 PC **A02**/MF **A01**
Fabrique Nationale d'Armes de Guerre, Herstal-les-Liege (Belgium).
Initiation Into the Utilization of Programmable Industrial Robots,
P. Krzesinski. 1982, 20p
Trans. from Initiation a l'Utilisation des Automates Programmables Industriels, n.p., 24p Mar 81. See also N82-14805/7.

A technique for expressing automation problems, i.e., graph of command stage and transition (GraFcet), is presented. It is intended as a methodological tool which aids in the communication of automated systems specifications between client and contractor. The language GraFcet comprehends two levels of specification. The first level describes the behavior of the command part of a system in relation to the operating part (functional specifications). The second level sets technological and environmental specifications with which the command part of a system must operate (operational specifications). Fundamental notions and the practical use of GraFcet are explained.

PB83-850040 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Metallization of Plastics. 1973-October, 1982 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for 1973-Oct 82.
Oct 82, 130p
Supersedes PB81-880486.

This bibliography contains citations concerning the metallization of plastics using a variety of application techniques. Spray equipment, electrodeposition, sputter coating, vacuum metallizing and in-mold electroplating are among the techniques utilized. Variations of types of metals and types of plastics are included as well as a discussion of applications such as automobile components, camera parts, RFI shielding, appliance parts and plumbing accessories. (This updated bibliography contains 149 citations, 40 of which are new entries to the previous edition.)

PB83-850057 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Metallization of Plastics. 1966-October, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Oct 82.
Oct 82, 81p
Supersedes PB81-863763.

This bibliography contains citations concerning the metallization of plastics using a variety of application techniques. Methods include vapor deposition, sputter and electroless plating. Special emphasis is placed on surface preparation prior to the metallization process. The applications of metallization include zinc and aluminum castings for the automotive industry, and decorative coatings in general. (This updated bibliography contains 141 citations, 10 of which are new entries to the previous edition.)

PB83-851402 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electric Discharge Machining. June, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 98p
Supersedes PB80-854813.

This bibliography contains citations concerning electric discharge machining technology, which is also referred to as electric spark machining, and electroerosive machining. Equipment, processes, and applications to electronics, toolmaking, and the machining of dies are considered. Performance and effectiveness of electric spark machining of parts of various sizes and metals are included. (This updated bibliography contains 112 citations, 78 of which are new entries to the previous edition.)

PB83-851667 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Casting Technology: Nonferrous Metals and Alloys. 1976-October, 1982 (Citations from Information Services in Mechanical Engineering Data Base).
Rept. for 1976-Oct 82.
Oct 82, 81p
Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

This bibliography contains citations concerning metal casting technology in the nonferrous metals industry. Energy conservation relative to casting processes and furnace operation and design are presented. Graphite based molding materials, equipment development and protective coatings for dies and die-casting molds are also considered. Marketing programs and performance evaluations of processes are discussed. Casting technology of copper is emphasized in another bibliography. (Contains 94 citations fully indexed and including a title list.)

PB83-851683 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Etching Technology. June, 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 157p
Supersedes PB80-858137.

This bibliography contains citations concerning research and development of etching technology relative to various surfaces and materials. Included are discussions of various methods and processes used, such as electron beam etching, ion sputtering, and plasma etching. (This updated bibliography contains 119 citations, 45 of which are new entries to the previous edition.)

PB83-851691 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Plating on Plastics. June, 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 109p
Supersedes PB80-857485.

This bibliography contains citations concerning the technology of plating or electroplating on plastic materials. Processes, materials, and applications of the plating of plastics are presented. Electrodeposited coatings, electrostatic coatings, electrostatic spraying and sputtering are among the techniques discussed. (This updated bibliography contains 74 citations, 31 of which are new entries to the previous edition.)

PB83-851717 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Plastics Blow Molding. June, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 212p
Supersedes PB80-857022.

This bibliography contains citations concerning research and development of plastics blow molding technology. Polyethylene, polyvinyl chloride, polypropylene, polyvinyl alcohols, polyesters, and polyacrylonitrile are among the thermoplastics discussed relative to the blow molding processes. Blow molding techniques, mold design and fabrication, and equipment and accessory developments are included. (This updated bibliography contains 233 citations, 90 of which are new entries to the previous edition.)

PB83-851741 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Magnetic Separation of Materials. June, 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for Jun 76-Oct 82.
Oct 82, 294p
Supersedes PB82-859083.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning the use of high strength magnets for material separation. Major emphasis is placed on the separation of magnetic materials from coal; however, magnetic separation is also discussed in terms of waste water treatment, desulfurization of minerals, and the recovery of iron oxide from flyash. In addition, magnetic separation is applied to recycling and processing of solid waste. (This updated bibliography contains 272 citations, 38 of which are new entries to the previous edition.)

PB83-851873 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Plasma Etching Technology and Applications. 1970-October, 1982 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for 1970-Oct 82.
Oct 82, 109p
Supersedes PB82-859208.Prepared in cooperation with the American Inst. of Physics, New York.

Citations in this bibliography cover plasma etching techniques, technology, and applications to a wide variety of materials and surfaces. Considered are endpoint detection, plasma mechanisms, magnetic field control of reactive plasma, and plasma flow-rate dependencies and effects. (This updated bibliography contains 96 citations, 18 of which are new entries to the previous edition.)

PB83-851881 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Rapid Quenching of Metals. 1971-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1971-Oct 82.
Oct 82, 145p
Supersedes PB82-859356.

This bibliography contains citations concerning the techniques for, and properties of, rapidly-quenched and splat-quenched ferrous and nonferrous metals. Excluded are references to forming or pressing of the metals after being rapidly quenched. The citations include references to metallographic studies on various physical properties, magnetic properties, conductivity, structure, and constituent phases. Rapid quenching is a technique to allow the preparation of alloys to meet specialized requirements for homogeneity, solubility, hardness, strength and corrosion resistance, as well as providing a means to study phase transformations. (This updated bibliography contains 152 citations, 35 of which are new entries to the previous edition.)

PB83-851915 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Ultrasonic Welding. June, 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 101p
Supersedes PB80-859796.

This bibliography contains citations concerning research and development technology of ultrasonic welding. Methods and processes of welding composites, plastic materials, thin films and integrated circuits are considered. Ultrasonic welding equipment, accessories, and devices are discussed relative to operation, performance, and manufacturing applications. (This updated bibliography contains 77 citations, 19 of which are new entries to the previous edition.)

PB83-851923 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fine Grinding. June, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 60p
Supersedes PB80-854821.

This bibliography contains citations concerning various methods and equipment used for fine grinding. Among the ground materials discussed are crystalline materials, powder alloys, and rubber using such grinding methods as stirred ball milling, and grained diamond wheel grinding. (This updated bibliography contains 56 citations, 23 of which are new entries to the previous edition.)

PB83-852038 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Operations Research Applied to Reliability and Quality Assurance. June, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 71p
Supersedes PB80-856297.

This bibliography contains citations concerning systems analysis and operations research to quality assurance and reliability programs. Network reliability, automatic assembly and fabrication, risk level analysis, reserve analysis and preventive maintenance are among the topics discussed relative to power generation, coal mining, transportation and manufacturing industries. (This updated bibliography contains 72 citations, 22 of which are new entries to the previous edition.)

PB83-852046 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Operations Research Applied to Reliability and Quality Assurance. August, 1971-October, 1982 (Citations from the NTIS Data Base).
Rept. for Aug 71-Oct 82.
Oct 82, 405p
Supersedes PB80-860125.

This bibliography contains citations concerning systems analysis and operations research to quality assurance and reliability programs. Consideration of applications to general and specific industries with regard to safety programs, operation continuity and maintenance programs are included. Applications to military installations are considered. (This updated bibliography contains 324 citations, 124 of which are new entries to the previous edition.)

PB83-852426 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electrostatic Painting. September, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Sep 70-Oct 82.
Oct 82, 221p
Supersedes PB82-858085.

This bibliography contains citations concerning the industrial and commercial use of electrostatic painting. Methods of applying electrostatic paints and coatings, descriptions of currently available devices for such applications, and studies of various types of coating materials are also discussed. (This updated bibliography contains 258 citations, 30 of which are new entries to the previous edition.)

PB83-852434 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electroplating of Chromium. 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Oct 82.
Oct 82, 144p
Supersedes PB82-859794.

This bibliography contains citations concerning the electroplating of chromium. Topics include black chromium for solar absorbers as well as low cost contacts for silicon cells. Automated plating processes for parts such as gun barrels are included, as is the plating of parts for wear resistance. The effects of chromium plated parts on metal stress and fatigue are also discussed. Particular emphasis is placed on the treatment of plating waste and metal recovery. (This updated bibliography contains 109 citations, 15 of which are new entries to the previous edition.)

PB83-852509 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electroplating of Copper. 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Oct 82.
Oct 82, 163p
Supersedes PB82-859778.

This bibliography contains citations concerning the electroplating of copper. The use of plated copper in solar cells and associated heat exchangers is emphasized. The mechanical properties of thin copper films are discussed in terms of deposit stress and adherence. The electrodeposition of copper on non-metallic surfaces is also presented. Problems associated with corrosive plating bath electrolytes and the disposal of plating waste are also included. (This updated bibliography contains 130 citations, 21 of which are new entries to the previous edition.)

PB83-852566 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Materials Handling in Manufacturing. June, 1970-October, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 89p
Supersedes PB80-859937.Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

This bibliography contains citations concerning technology in material handling relative to manufacturing, methods of production, and mathematical modelling, with predominate applicability to the aerospace industry. Innovative methods for improving various processing steps in the fabrication of double base rocket propellants, and computerized manufacturing systems are also included. (This updated bibliography contains 60 citations, 16 of which are new entries to the previous edition.)

PB83-852632 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sheet Metal Joining: Ferrous Alloys. 1972-October, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1972-Oct 82.
Oct 82, 183p
Supersedes PB82-858911.Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

This bibliography contains citations concerning the joining of ferrous alloy sheet metal - carbon steels, stainless steels, and high alloy sheet steels. Automatic inspections of joint seams using ultrasonic and eddy current methods are discussed. Localized heat treatment of welded seams in sheet metal is considered. Adhesive and weld bonding methods are included. (This updated bibliography contains 191 citations, 41 of which are new entries to the previous edition.)

PB83-852640 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sheet Metal Joining: Ferrous Alloys. 1966-October, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Oct 82.
Oct 82, 158p
Supersedes PB82-858903.

This bibliography contains citations concerning the joining of ferrous alloy sheet metal - carbon steels, stainless steels, HSLA steels, molybdenum and other alloy sheet steels. Joint analysis including stress analysis, warpage control, and failure mechanics is presented. Sheet joining techniques including adhesive bonding, seam, consumable and nonconsumable shielded electrode, and spot welding are discussed. The joining of aluminized, galvanized, and plastic coated sheet steels is considered. (This updated bibliography contains 236 citations, 24 of which are new entries to the previous edition.)

13I. Machinery and Tools

AD-A119 470/3 PC **A05**/MF **A01**
Naval Air Engineering Center, Lakehurst, NJ. Support Equipment Engineering Dept.
Wear Debris Analysis of Grease Lubricated Ball Bearings.
Final technical rept.,
A. S. Maciejewski, and J. W. Rosenlieb. 12 Apr 82, 100p Rept no. NAEC-92-152

An investigation was conducted to experimentally determine the wear surface condition of grease-lubricated ball bearings, by monitoring the wear debris retained in the grease. Testing of six bearings was performed on endurance test machines with grease sample removal. Visual and scanning electron microscope examinations of the bearing surfaces were performed per an established schedule by SKF. Respective grease samples were treated, analyzed, and correlated by NAVAIRENGCEN. A total of four bearings failed during the testing while the remaining two bearings reached time up. The testing, therefore, provided a good distribution of failed and unfailed bearings from which the evaluation of bearing failure or imminent failure detection by wear debris analysis could be established. The results of the wear debris analysis, performed by NAVAIRENGCEN compared to the physical examination of the bearings performed by SKF, showed a good correlation, in terms of monitoring the wear state/condition of the bearings throughout their life. As it appears presently, this analysis technique is best suited to the examination of used grease obtained from dismantled grease lubricated components or in design applications. (Author)

DE82010758 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Effects of Design Variables on the Critical Stresses of Eye Bars under Load: An Evaluation by Photoelastic Modeling.
R. G. Scott, and J. C. Stone. 8 Jan 82, 11p UCRL-87071, CONF-820516-2
Contract W-7405-ENG-48
Joint conference on experimental mechanics, Honolulu, HI, USA, 22 May 1982.

Textbooks on machine design and other relevant handbooks have not approached in depth the problem of estimating the effects of major design variables on the critical stresses in eye-bar lugs used for heavy lifting. The critical stresses determined experimentally by the photoelastic modeling of design variations of geometry and pin clearance with and without a bushing between the pin and the lug are discussed. Experimental data are compared to values developed from theoretical analysis. (ERA citation 07:044365)

DE82012734 MF **A01**
Lawrence Livermore National Lab., CA.
Development of an Inexpensive, High-Accuracy Diamond Turning Machine.
D. C. Thompson, J. L. Chrisiock, and L. E. Newton.
Aug 81, 9p UCRL-86593, CONF-810810-30
Contract W-7405-ENG-48
25. international symposium of the Society of Photo-optical Instrumentation Engineers, San Diego, CA, USA, 24 Aug 1981, Portions of document are illegible. Best available copy from document source. Available in microfiche only.

The Lawrence Livermore National Laboratory (LLNL) Machine Tool Development and Machine Control Groups have recently completed the construction of a small, high-accuracy, two-axis numerically controlled Diamond Turning Machine. The machine, which was assembled from commercially available components, cut it's first contoured part two weeks after the project was initiated, and was placed in service after a total of three weeks. One-inch diameter hemispherical aluminum test parts have been cut to an accuracy of 10 microinch (size and contour band) with a surface finish of 1 to 1.5 microinch rms. The machine, which is limited to parts less than four inches in diameter, has been designated the Baby Optics Diamond Turning Machine.

N82-31664/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
A Digital Optical Torquemeter for High Rotational Speed Applications.
D. J. Lesco, D. R. Buchele, and L. G. Oberle. Aug 82, 17p NAS 1.15:82914, E-1189, NASA-TM-82914

A digital optical torquemeter system designed for applications at high rotational speeds was fabricated and tested for zero stability at speeds up to 20,000 rpm. Data obtained in a spin rig and with simulated inputs demonstrate that the system is capable of measuring torque bar twist to within 0.03 degrees at speeds of 30,000 rpm. The optical system uses fiber optic bundles to transmit light to the torque bar and to silicon avalanche detectors. The system is microcomputer based and provides measurements of average torque and torque as a function of angular shaft position. The torquemeter requires no bearings or other contact between the rotating torque bar and the nonrotating optics, and tolerates movement of the torque bar as large as 1 mm relative to the optics.

N82-31702/5 PC **A06**/MF **A01**
Physikalisch-Technische Bundesanstalt, Brunswick (Germany, F.R.). Abt. 1 Mechanik.
Investigations on the Flattening During the Touching of Flat and V-Grooves with Steel Balls Untersuchungen Zur Abplattung Beim Antasten von Ebenen und V-Nuten MIT Stahlkugeln.
Ph.D. Thesis - Tech. Univ. Carolo-Wilhelmina.
F. Luedicke. Jan 82, 107p PTB-ME-34, ISSN-0341-6720
Text in German.

The flattening process during the touching of flat and V-grooves with steel balls, for a transition of the touching force from zero to 1 N was studied by a lateral measuring device. The validity of Hertz' theory was shown for all pairings of polished surfaces. Equations were developed to calculate the flattening of polished V-grooves in the symmetrical case. The measuring results on raw flat and V-grooves depend in the same way on the flank angle as on polished surfaces. Empirical equations which describe the flattening coefficient were developed to transfer the present measuring results to corresponding touching processes in the length measuring technique. It is found that in spite of different plastic deformations, the hardness of previously untouched specimens does not influence on the amount of flattening.

N82-31968/2 PC **A07**/MF **A01**
SKF Industries, Inc., King of Prussia, PA. Technology Services Div.
High Speed Cylindrical Roller Bearing Analysis. SKF Computer Program Cybean. Volume 2: User's Manual.
Final Report.
G. J. Dyba, and R. J. Kleckner. Jun 81, 147p NAS 1.26:165364, SKF-AT81D049-V-2, NASA-CR-165364
Contract NAS3-22690

CYBEAN (CYlindrical BEaring ANalysis) was created to detail radially loaded, aligned and misaligned cylindrical roller bearing performance under a variety of operating conditions. Emphasis was placed on detailing the effects of high speed, preload and system thermal coupling. Roller tilt, skew, radial, circumferential and axial displacement as well as flange contact were considered. Variable housing and flexible out-of-round outer ring geometries, and both steady state and time transient temperature calculations were enabled. The complete range of elastohydrodynamic contact considerations, employing full and partial film conditions were treated in the computation of raceway and flange contacts. The practical and correct implementation of CYBEAN is discussed. The capability to execute the program at four different levels of complexity was included. In addition, the program was updated to properly direct roller-to-raceway contact load vectors automatically in those cases where roller or ring profiles have small radii of curvature. Input and output architectures containing guidelines for use and two sample executions are detailed.

N82-31969/0 PC **A12**/MF **A01**
SKF Technology Services, King of Prussia, PA.
Research Report: User's Manual for Computer Program AT81Y003 SHABERTH. Steady State and Transient Thermal Analysis of a Shaft Bearing System Including Ball, Cylindrical and Tapered Roller Bearings.
Final Report.
G. B. Hadden, R. J. Kleckner, M. A. Ragen, and L. Sheynin. May 81, 254p NAS 1.26:165365, SKF-AT81DO40, NASA-CR-165365
Contract NAS3-22690

The SHABERTH program is capable of simulating the thermomechanical performance of a load support system consisting of a flexible shaft supported by up to five rolling element bearings. Any combination of ball, cylindrical, and tapered roller bearings can be used to support the shaft. The user can select models in calculating lubricant film thickness and traction forces. The formulation of the cage pocket/rolling element interaction model was revised to improve solution numerical convergence characteristics.

N82-32200/9 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Escalator Design Features Evaluation.
Final Report.
W. F. Zimmerman, and G. K. Deshpande. 1 Jul 81, 50p NAS 1.26:169266, JPL-PUBL-81-78, NASA-CR-169266
Contract NAS7-100
Sponsored in Part by DOT.

Escalators are available with design features such as dual speed (90 and 120 fpm), mat operation and flat steps. These design features were evaluated based on the impact of each on capital and operating costs, traffic flow, and safety. A human factors engineering model was developed to analyze the need for flat steps at various speeds. Mat operation of escalators was found to be cost effective in terms of energy savings. Dual speed operation of escalators with the higher speed used during peak hours allows for efficient operation. A minimum number of flat steps required as a function of escalator speed was developed to ensure safety for the elderly.

PAT-APPL-6-361 330 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Electronic Plug-In Module Extractor.
Patent Application,
John Kelly. Filed 25 Mar 82, 9p AD-D009 690/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An extractor tool, by mechanical advantage, applies a large extracting force for removing a plug-in module from a chassis. An extractor plate is slidably connected to a frame, and has a cam pin which is engageable with a cam surface on an extracting cam. A handle integral with the extracting cam is used to rotate the extracting cam against the cam pin thereby changing rotational motion to straight-line motion. The extractor plate has a pair of pins which are engageable with holes in the plug-in module assembly and straight-line motion of the extractor plate separates a male connector from its mating female connector.

PAT-APPL-6-364 093 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Magnetic Bearing and Motor.
Patent Application,
P. A. Studer. Filed 31 Mar 82, 19p N82-29603/9, NASA-CASE-GSC-12725-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A magnetic bearing for passively suspending a rotatable element subjected to axial and radial thrust forces is disclosed. The magnetic bearing employs a taut wire stretched along the longitudinal axis of the bearing between opposed end pieces and an intermediate magnetic section. The intermediate section is segmented to provide oppositely directed magnetic flux paths between the end pieces and may include either an axially polarized magnets interposed between the segments. The end pieces, separated from the intermediate section by air gaps, control distribution of magnetic flux between the intermediate section segments. Coaxial alignment of the end pieces with the intermediate section minimizes magnetic reluctance in the flux paths endowing the bearing with self-centering characteristics when subjected to radial loads. In an alternative embodiment, pairs of oppositely wound armature coils are concentrically interposed between segments of the intermediate section in concentric arcs adjacent to radially polarized magnets to equip a magnetic bearing as a torsion drive motor. the magnetic suspension bearing disclosed provides long term reliability without maintenance with application to long term space missions such as the VISSR/VAS scanning mirror instrument in the GOES program.

PAT-APPL-6-364 094 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Workpiece Positioning Vise.
Patent Application,
F. C. Hallberg, and C. J. Morgan. Filed 31 Mar 82, 16p N82-29604/7, NASA-CASE-GSC-12762-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A pair of jaw assemblies simultaneously driven in opposed reciprocation by a single shaft has oppositely threaded sections to automatically center delicate or brittle workpieces such as lithium fluoride crystal beneath the blade of a crystal cleaving machine. Both jaw assemblies are suspended above the vise bed by a pair of parallel guide shafts attached to the vise bed. Linear rolling bearings, fitted around the guide shafts and firmly held by opposite ends of the jaw assemblies, provide rolling friction between the guide shafts and the jaw assemblies. A belleville washer at one end of the drive shaft and thrust bearings at both drive shaft ends hold the shaft in compression between the vise bed, thereby preventing wobble of the jaw assemblies due to wear between the shaft and vise bed.

PAT-APPL-6-387 726 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Directional Gear Ratio Transmission.
Patent Application,
A. E. Lefever. Filed 11 Jun 82, 15p N82-29605/4, NASA-CASE-LAR-12644-1
Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Epicyclic gear transmissions which transmit output at a gear ratio dependent only upon the input's direction are considered. A transmission housing envelops two epicyclic gear assemblies, and has shafts extending from it. One shaft is attached to a sun gear within the first epicyclic gear assembly. Planet gears are held symmetrically about the sun gear by a planet gear carrier and are in mesh with both the sun gear and a ring gear. Two unidirectional clutches restrict rotation of

the first planet gear carrier and ring gear to one direction. A connecting shaft drives a second sun gear at the same speed and direction as the first planet gear carrier while a connecting portion drives a second planet gear carrier at the same speed and direction as the first ring gear. The transmission's output is then transmitted by the second ring gear to the second shaft. Input is transmitted at a higher gear ratio and lower speed for all inputs in the first direction than in the opposite direction.

PAT-APPL-6-393 267 PC **A03**/MF **A01**
Department of the Air Force, Washington, DC.
Adjustable Balance Weight for Rotating Shaft.
Patent Application,
David J. Wiebe. Filed 29 Jun 82, 30p AD-D009 704/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A balance weight mechanism is attached to a tubular engine shaft for correcting unbalance in the engine. The tubular shaft includes a stiffener plate mounted therein transversely to the rotational axis of the shaft. The balance weight mechanism includes a balance weight arm and a fastener for releasably fastening an end of the arm to a generally central location on the stiffener plate. Spline teeth on the balance weight arm face toward the stiffener plate and are aligned to intermesh with an arc of an annular spline ring on the plate for holding the arm in a desired angularly adjusted position extending outwardly radially from the axis of rotation of the shaft when the arm is fastened tightly against the plate. (Author)

PB83-110577 PC **A07**/MF **A01**
Shaker Research Corp., Ballston Lake, NY.
Railcar Roller Bearing Failure Progression Tests.
Final rept. Mar 78-Mar 79,
Warren D. Waldron. Apr 82, 130p 79-TR-48, DOT-TSC-FRA-81-7, DOT/FRA/ORD-81/26
Contract DOT-TSC-1536

This report describes the laboratory endurance test of six railcar roller bearings that had previously suffered physical damage or were otherwise degraded as a result of actual railroad service. Two different onboard impending bearing failure sensors were also physically evaluated. The objectives of the tests were to obtain a better understanding of the railcar roller bearing failure process(es), the manner in which bearing defects progress, and the effectiveness of the impending failure warning devices. A 150 hour test with 26,250 pounds radial load (equivalent full car load) at 526 rpm (equivalent to approximately 52 mph) was planned for each bearing. Only one bearing actually failed to complete the 140 hour test. All bearings exhibited further measurable degradation of defect progression during the course of the tests. Neither warning device actually gave warning of the one failure experienced.

PB83-111666 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC.
Evaluation of Chain Saw Kickback Motion Using Optoelectronic Measurement System,
Donald Robinson, and Charles Federman. Aug 82, 73p NBSIR-82-2559
Sponsored in part by Consumer Product Safety Commission, Bethesda, MD.

In 1980 the Consumer Product Safety Commission initiated the in-house development of a mandatory standard to address chain saw kickback. Part of that effort involved relating known chain saw energy levels generated during kickback to the final angle that a saw might travel when held in the hands of a chain saw operator. The present report describes the experimental program developed at NBS to determine the relationship between kickback energy and chain saw motion during hand-held kickbacks for selected samples of consumer-type chain saws and volunteer test subjects. The measurement system employed in this research included a computer-controlled optoelectronic system for measuring the displacements of selected points on the test saws and test fixture during simulated kickbacks. Included in the report is a description of the test equipment and procedures, the experimental design, and analyses of the measured displacement data for chain saws having known values of kickback energy.

PB83-851972 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Perforated Cylinders: Textile Processes. 1975-October, 1982 (Citations from World Textile Abstracts).
Rept. for 1975-Oct 82.
Oct 82, 57p
Prepared in cooperation with Shirley Inst., Manchester (England).

This bibliography contains citations concerning the utilization of perforated cylinders and perforated drums in textile handling processes. Applications and performance evaluations for such processes as multicolor dyeing, heat-bonding, impregnation and alignment of rovings, drying, and spinning are included. Scouring processes as well as various wet treatment and pretreatment of fabrics utilizing perforated drums and cylinders are emphasized. (Contains 83 citations fully indexed and including a title list.)

PB83-852582 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Ceramic Tools for Metal Finishing and Cutting. 1966-October, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Oct 82.
Oct 82, 137p
Supersedes PB82-857889.

This bibliography contains citations concerning ceramic tools for the cutting, grinding, and finishing of metals. Emphasis is placed on wear resistance and tool service life, as well as the fabrication of tools based on metal oxides, carbides, and nitrides. (This updated bibliography contains 213 citations, 39 of which are new entries to the previous edition.)

13J. Marine Engineering

AD-A119 404/2 PC **A02**/MF **A01**
Iowa Univ., Iowa City.
Added Moment of Inertia of Rolling Ship Sections,
P. P. Hsu, and L. Landweber. 25 Feb 81, 6p Rept no. IIHR-REPRINT-563
Contract N00014-76-C-0012
Pub. in Jnl. of Ship Research, v26 n2 p89-93 Jun 82.

No abstract available.

AD-A119 506/4 PC **A04**/MF **A01**
Naval Facilities Engineering Command, Alexandria, VA.
Marine Railways. Design Manual 29.2.
Final rept.
Jan 82, 52p Rept no. NAVFAC-DM-29.2

Design criteria and construction information for use by qualified engineers are presented for marine railways, Category Code 213-20. The contents include: comparison with drydocks; site selection; dimensions; design loads, groundways, cradles; hauling systems, controls; and support facilities. (Author)

AD-A119 511/4 PC **A04**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
The Effects of Hull Pitching Motions and Waves on Periodic Propeller Blade Loads.
Final rept.,
Stuart D. Jessup, and Robert J. Boswell. Sep 82, 65p Rept no. DTNSRDC-82/093
Presented at the Symposium on Naval Hydrodynamics (14th), 23-27 Aug 82, Ann Arbor, MI.

Fundamental investigations were made of the effects of periodic hull pitching motions and waves on the periodic loads on propeller blades and bearings. These periodic loads were measured during carefully controlled model experiments in which the periodic hull pitching motions, regular waves, and relative phase of the hull pitching to the wave encounter were systematically and independently varied. The periodic blade loads were calculated using trochoidal wave velocity profiles, and representation of the propeller based on a quasi-steady method. The results of both theory and experiment show significant modulation of the amplitudes of the periodic blade loads with hull pitching motions and wave frequency of encounter. The influence of the hull significantly modifies the amount of modulation of the shaft frequency loads due to both the periodic vertical motion of the propeller and the trochoidal wave velocity profile in the absence of the hull. Therefore, for engineering purposes, the modulation of blade loads due to waves and hull motions for transom type hulls can be estimated by simple trochoidal wave velocity profiles, quasi-steady propeller theory, and constant multiples derived from the experiments presented in this paper.

AD-A119 547/8 PC **A02**/MF **A01**
Naval Underwater Systems Center, New London, CT. New London Lab.
Particle Sampling and Analysis in Dabob Bay, Washington.
Technical rept.,
Charles L. Brown. 13 Sep 82, 23p Rept no. NUSC-TR-6733

The concentration of particles in the water column was correlated with turbulence in the boundary layer of experimental underwater vehicle B-1 in Dabob Bay, Washington, in 1979. With the advent of field testing of experimental vehicle LDV-2 in the same location, a more comprehensive particle sampling program was implemented in 1980. From samplings taken from August through December 1980, the average total number of particles in the size range 50 - 2000 micrometers was 14,063/cu m. During the same time period, fecal pellets in the size range 100 - 1000 micrometers averaged 7399/cu m, or 53 percent of the total particles observed. For all sampling dates, particle sizes of 3.6 to about 50 micrometers, as determined by a Coulter Counter, were the most abundant, averaging 3181 x 10 to the 6th power/cu m, or five orders of magnitude greater than the larger particles taken by the net. For the 74 micrometers mesh net samples, 72 percent of the particles fell within the size range of 100 - 500 micrometers. Thirteen percent of the particles were in the size range of 50 - 100 micrometers. Fourteen percent of the particles were in the size range of 500 - 1000 micrometers, whereas less than 1 percent were in the range above 1000 micrometers. (Author)

AD-A119 747/4 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
A Method to Compute the Force Signature of a Body Impacting on a Linear Elastic Structure Using Fourier Analysis.
Interim rept. FY 81-82,
G. J. O'Hara, and R. S. Schechter. 17 Sep 82, 19p Rept no. NRL-MR-4875

A method is derived to compute the force signature of a body impacting on a linear elastic structure. The time history of the impacting force is reconstructed from the response to impulse and response to the force at various points on the structure. The method is quite general and is applicable to any linear structure. The method is tested on a two degree of freedom system with various applied forces and reconstructs the forces very accurately. (Author)

AD-A119 799/5 PC **A04**/MF **A01**
Iowa Inst. of Hydraulic Research, Iowa City.
Effect of Boundary Layer on Thrust Deduction.
Final rept. Oct 78-Oct 80,
S. P. G. Dinavahi, and L. Landweber. Nov 81, 54p Rept no. IIHR-239
Contract N00014-79-C-0243

Methods of computing thrust deduction usually ignore viscous effects and assume that the flow field of the ship and propeller is irrotational. The present work was undertaken in order to compare the computed values of the thrust deduction with and without the boundary layer and wake. A streamlined body of revolution was selected, and a sink on the axis behind the body was used as a simple mechanism to simulate the suction at the stern induced by the propeller. A measure of the accuracy of a calculated irrotational-flow pressure distribution for a body in a uniform stream is the nonzero magnitude of its pressure drag. It has been found that, for calculating thrust deduction, the errors of available methods were acceptably large. A procedure for obtaining greatly increased accuracy was developed and applied to calculate the thrust deduction for irrotational flow. When the boundary and wake are present, the thick boundary near the tail of the body is first calculated by a previously developed method, in which the equations of a thick boundary layer and wake are solved numerically by finite differences, and the outer irrotational flow is obtained as the solution of an integral equation. An iteration procedure in which the inner and outer flows are successfully adjusted converges to the desired solution. (Author)

AD-A119 800/1 PC **A06**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Ocean Engineering.
Experimental and Theoretical Studies of the Effect of Gas Content on Unsteady Cavity Flows.
Final rept. 1 Oct 79-31 Jan 81,
Robert J. Van Houten, and H. Clayton Sayre. Jan 82, 112p Rept no. 82-1
Contract N00014-80-C-0224

A partially cavitating two-dimensional hydrofoil was oscillated in pitch while air was bled into the cavity at a controlled rate. By varying the ambient pressure and air flow rate simultaneously, a constant ventilation number was maintained for a series of cavity air partial pressures. Unsteady forces and cavity pressures were measured, and photographs taken. It was found that cavity air caused fluctuating cavity pressures, and tended to stabilize cavity length. Its effect on force coefficients was relatively modest. These trends were also found from a parallel theoretical investigation in which a computer program which predicts unsteady cavitation of 2-D foils was modified to allow for cavity gas. (Author)

AD-A119 812/6 PC **A02**/MF **A01**
Naval Intelligence Support Center, Washington, DC.
KYNDA Class 20 Years Old.
S. Breyer. 6 Aug 82, 9p Rept no. NISC-TRANS-6875
Trans. of Marine Rundschau (Germany, F.R.) n5 p252-255 May 82.

No abstract available.

DE82902158 MF **A01**
GKSS - Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.)
Feasibility of Structural Integrity Monitoring of Offshore Platforms Using Vibration Analysis.
G. Witte. 1980, 11p GKSS-80/E/42, CONF-8009228-1
In German.International congress on marine research and marine technology (Intermaritec '80), Hamburg, F.R. Germany, 24 Sep 1980, Portions of this report are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The feasibility of strength monitoring of offshore platforms by analysing their vibration behaviour has been investigated. This so called signature analysis is a new tool for early fault detection and for the near future it can be expected, that this method will partially substitute conventional inspection techniques e.g. the visual checking of structures by divers. Some fundamental aspects of structural failures and their origin are presented. The global and local vibration behaviour of offshore platforms is described as well as the basic principles of the signature analysis. The statistical accuracy and the practicable frequency resolution of vibration measurements have been investigated. Experiences and results of model tests and measurements on the research platform NORDSEE itself are given for confirmation of the theoretical considerations. It can be concluded, that a change of approximately one percent in structural stiffness due to a failure will be detectable by vibration analysis. (ERA citation 07:044456)

N82-31637/3 PC **A07**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
Real Time Estimation and Prediction of Ship Motions Using Kalman Filtering Techniques.
M. A. Triantafyllou, M. Bodson, and M. Athans. Jul 82, 142p NAS 1.26:169284, LIDS-R-1220, NASA-CR-169284
Contract NGL-22-009-124

A landing scheme for landing V/STOL aircraft on rolling ships was sought using computerized simulations. The equations of motion as derived from hydrodynamics, their form and the physical mechanisms involved and the general form of the approximation are discussed. The modeling of the sea is discussed. The derivation of the state-space equations for the DD-963 destroyer is described. Kalman filter studies are presented and the influence of the various parameters is assessed. The effect of various modeling parameters on the rms error is assessed and simplifying conclusions are drawn. An upper bound for prediction time of about five seconds is established, with the exception of roll, which can be predicted up to ten seconds ahead.

PAT-APPL-6-370 309 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
A Capstan Adaptable 'V' Puller.
Patent Application,
Richard C. Swenson. Filed 21 Apr 82, 7p AD-D009 687/5
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The patent application describes a capstan adaptable V puller fitted with plurality of vertical staves and is positioned on a host capstan. The staves are adjusted to the diameter of the capstan and securely clamped in place by any suitable means. Friction is enhanced by rubber pads mounted between the contact surface of the capstan and the staves. (Author)

PAT-APPL-6-391 900 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Overboarding Fixture.
Patent Application,
Charles E. Hansen, and Paul A. Hanson. Filed 25 Jun 82, 12p AD-D009 685/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved fairlead reduces the problems associated with deploying and retrieving a towing cable and its interconnected elongate instrumentation array. A pair of parallel rollers orthogonally disposed to a storage winch reel are spaced apart to present a smooth, protuberance-free surface to accommodate the elongate instrumentation array. A shell coaxially disposed about each of the cylinders is rotated to cover the smooth protuberance-free surfaces and present a pair of abrasion-resistant surfaces when the towing cable is reeled in or payed out. Since it is likely that the abrasion-resistant surface might be scored by the towing cable, rotating the abrasion-resistant surfaces out of the way to expose the protuberance-free accommodating surfaces when the array goes through the fairlead helps reduce the possibility of damage of the elongate instrumentation array during deployment and recovery.

PB83-111492 PC **A07**/MF **A01**
National Oceanic and Atmospheric Administration, Rockville, MD. Office of Ocean Technology and Engineering Services.
Characterization Tests of Datawell HIPPY 120C Vessel Motion Sensor.
Technical rept.,
Donald Pryor. May 82, 143p NOAA-TR-OTES-8, NOAA-82072301
Portions of this document are not fully legible.

This report describes the results of a series of tests conducted to characterize the performance of a vessel motion sensor - the HIPPY 120C. The HIPPY 120C was designed to measure heave, roll, and pitch motions so that errors caused by these motions can be removed from hydrographic data. The series of tests include lab tests, van tests, and field tests. Laboratory tests were conducted to examine the response to ideal, well-controlled motions. The effects of horizontal accelerations were examined by testing the device mounted in a van. Field tests were run to examine the performance in a realistic operating environment. The test results showed that the HIPPY is capable of meeting the error budgets proposed for NOS's automated survey system. With the exception of physical size and low frequency response, the device appears to meet all NOS requirements which have been proposed for this type of service.

PB83-114652 PC **A03**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Lab. voor Scheepshydromechanica.
Computerprogramma voor het Berekenen en Tekenen van Huldplaatuitslagen (Computer Progam for Computing and Drawing Shellplate Cuts for Ships).
Final rept.,
A. Bersluis. Jul 79, 35p 480
Text in Dutch.

The report describes (mostly through drawings and computations) a computerized method in preparing cut-outs of shell plates for ships. The method bears a similarity with the cross-stencil method still being employed in small shipyards.

PB83-800466 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cavitation: Hydrofoils. 1964-September, 1982 (Citations from the NTIS Data Base).
Oct 82, 217p
Supersedes PB81-808206 and PB80-810575.

Studies are presented on the cavitation characteristics of various classes of hydrofoils such as fully submerged, ventilated, high speed, supercavitating, and jet flapped. Surface piercing struts are studied. Test facilities, models, and test methods are described. Discussions are made of lift, drag, oscillation, flutter, heaving, hydroelasticity, and loading. Other topics include entrainment, bubbles, unsteady forces, flow fields, sea states, cavitation noise, mathematical models, and boundary layers, along with investigations of hydrofoil craft performance. (This updated bibliography contains 209 citations, 4 of which are new entries to the previous edition.)

PB83-851774 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Offshore Safety. June, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 75p
Supersedes PB80-858616.

This bibliography contains citations concerning accident prevention, fire prevention, and the safety of structures in offshore operations. Traffic management and safety engineering are discussed. Computerized simulations of offshore collisions of surface vessels are included. (This updated bibliography contains 74 citations, 17 of which are new entries to the previous edition.)

PB83-851832 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Deep Sea Mining: Equipment and Techniques. 1974-October, 1982 (Citations from Oceanic Abstracts).
Rept. for 1974-Oct 82.
Oct 82, 215p
Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

This bibliography contains citations concerning design and testing of tools and equipment for underwater commercial operations. The equipment is used for the construction, maintenance and salvage of structures or flowlines used for mining nodules, sand, gravel and high value alluvial deposits and for gas and oil well operations. Equipment includes remote controlled vehicles, robots and manipulators, viewing and inspection equipment, underwater explosives and welding equipment, and submersibles and underwater sleds. Towed instruments for exploration and seismic exploration devices are also included. (Contains 242 citations fully indexed and including a title list.)

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

AD-A119 608/8 PC **A04**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Business Group.
Antimisting Fuel Degrader Investigation.
Final rept. Aug 81-Jan 82,
George A. Coffinberry. Jun 82, 65p DOT/FAA/CT-82/72
Contract DOT-FA79NA-6043

An investigation was made of the General Electric F101 augmentor fuel pump to perform as a degrader of AMK fuel. The test plan specified the pump be run at three power conditions in four separate tests. Test 1 was run utilizing Jet-A fuel to calibrate system parameters and set fuel rates at idle (1200 pounds per hour), cruise (5500 pph) and takeoff (16000 pph). Test 2 utilized AMK fuel at the same fuel flow rates as were used for Jet-A fuel, the pump being in its standard configuration. Tests 3 and 4 utilized AMK fuel at the same conditions, however, the pump was successively modified to enhance AMK degradation. Fuel samples were taken at the pump inlet and discharge. Pump inlet and discharge pressures and temperatures were monitored. Special sampling procedures were utilized to prevent the inadvertent degradation of the AMK fuel

during the sampling process. Very high degradation levels of the AMK fuel was achieved at the cruise power condition for all three pump configurations. Somewhat reduced degradation levels were achieved at the idle and takeoff modes depending upon which pump configuration was being tested. Further testing was conducted to try to enhance degradation at the idle mode in the standard pump configuration. These results showed very high levels of degradation when the pump speed was increased by 12 percent. (Author)

13L. Safety Engineering

AD-A119 783/9 PC **A02/MF A01**
Fire Research Corp., Nesconset, NY.
Firefighter Vehicle Training Simulator Conceptual Design.
Final rept. Sep 80-Sep 81,
Jack McLoughlin, and Anthony J. Kwan. Nov 81, 22p
AFESC/ESL-TR-81-55
Contract F08635-80-C-0319

This report describes the development of a conceptual design for a fire fighter vehicle training simulator. The simulator will be used to train Air Force fire fighters in fire suppression, vehicle operations, turret operations, decision making, tactics, and communications. A thorough analysis of all possible simulation techniques was conducted. The USAF approved conceptual design uses current state-of-the-art microprocessors, video systems, and theatrical fire and smoke techniques. The simulator is designed to be cost efficient, while taining the realism that is necessary for an effective crash rescue fire suppression simulator. One of the major outputs of the study was a video tape demonstrating the theatrical techniques and realistic capabilities of the designed simulator system. (Author)

DE82005343 MF **A01**
BDM Corp., Albuquerque, NM.
Bates Solar-Industrial Process-Heat Application Safety Analysis.
10 Jun 81, 29p DOE/CS/30312-T1
Contract FC03-79CS30312
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

A Solar Industrial Process Heat System was designed for a corrugated box manufacturer. The manufacturer intends to install approximately 35,000 square feet of linear parabolic trough solar collectors in an area south of its new corrugator plant. The parabolic collectors will collect thermal energy required to generate 5500 lbs/hr of steam to drive the corrugator. The solar energy system will satisfy the average daily demand of the corrugator and will operate in parallel with the fossil fuel boiler which will supply supplemental steam when necessary. A schematic of the system is presented. A safety analysis was done on the solar energy system and an assessment of its effect on the employees was made. Potential hazards of the system will be addressed, including corrective measures. A description of each of the solar project subsystems is presented. For each subsystem the possible safety hazards are identified and recommendations are made either to eliminate or control the hazards at an acceptable level. The subsystems, their safety analysis, and resolution are summarized. Safety procedures will be written as part of the O and M plan, and all hazards will be clearly marked with warning signs. (ERA citation 07:042953)

DE82009627 PC **A02/MF A01**
Oak Ridge National Lab., TN.
Personnel Safety for Electric Utilities with Dispersed Storage and Generation (DSG).
D. T. Rizy. 1982, 6p CONF-820350-1
Contract W-7405-ENG-26
Control of power systems conference, Tulsa, OK, USA, 23 Mar 1982.

Present day safety practices and hardware employed by electric utilities in electric distribution systems have evolved consistent with the unidirectional flow of electric power from central production facilities at the generation level to dispersed loads at the electric distribution level. The interconnection of dispersed production devices, such as wind powered ac generators and photovoltaic powered dc-to-ac inverters, to the electric utility system at the distribution level will pose problems with these present safety methods. DSG devices will produce bidirectional flow of real electric power that can re-energize sections of the electric distribution system that have been open-circuited by recloser operation for an abnormal system condition, such as a fault, or at the substation breaker by utility personnel for maintenance. Preliminary results of a study underway by Oak Ridge National Laboratory (ORNL) indicates that present practices with some modification and without major hardware changes can be used for an electric distribution system with a low penetration level of DSG devices. However, automatic disconnect/connect schemes, centrally controlled by the utility, appear to be a more practical method for the maintenance of an electric distribution system with a high penetration level of DSG devices. The major barrier to the implementation of these automatic schemes is in meeting present national and electric utility industry safety standards requiring a visible open-circuit and lock-out capability for the maintenance of electric sources in the electric distribution system. (ERA citation 07:053674)

PB82-916304 PC **A03/MF A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Railroad Accident Report - Rear End Collision of Louisville and Nashville Railroad Company Trains No. 586 and Extra 8072 North, New Johnsonville, Tennessee, December 28, 1981.
23 Aug 82, 37p NTSB-RAR-82-4
Paper copy also available on subscription, North American Continent price $55.00/year; all others write for quote.

About 9:30 a.m. on December 28, 1981, Louisville and Nashville Railroad Company (L&N) northbound train No. 586 struck the rear of standing L&N train Extra 8072 North at New Johnsonville, Tennessee. Train No. 586 passed two consecutive wayside automatic block signals displaying an approach aspect (yellow) and a restricted proceed aspect (red), respectively, before it struck the rear of Extra 8072 North. The caboose and six cars of Extra 8072 North and five locomotive units and one car of No. 586 were derailed. The conductor of Extra 8072 North was killed, and the engineer and head brakeman of No. 586 were slightly injured. Damage was estimated at $998,313. The National Transportation Safety Board determines that the probable cause of this accident was the lack of alertness of the engineer and head brakeman of train No. 586 in approaching the area of the accident and the failure of the engineer of train No. 586 to properly use the automatic train brakes to control the speed of the train in compliance with the speed requirements of the wayside automatic block signal aspects, so that the train could be stopped before it struck standing train Extra 8072 North.

PB83-102954 CP **T02**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base: 1976 Equipment/Casualty Report File.
Data file,
Bennie Johnson. 31 Dec 76, mag tape FEMA/DF-82/015
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Software for processing is available.

The U.S. Fire Administration established the National Fire Incident Reporting System for the collection of fire incident and fire casualty data on a nationwide basis. NFIRS is the center of the National Fire Data Center's program which has as one of its primary goals assisting state and local governments and other critical groups in the development of their own fire data systems, and in the use and interpretation of their data. NFIRS contributes to the second major goal of the Data Center, as well; this is to determine the magnitude and characteristics of the U.S. fire problem in sufficient detail and accuracy to guide fire protection decisions of various levels of government and the private sector, and help identify solutions to the problems identified. The NFIRS data contains three files. The first is the Master File, the second is the Incident and the third is the Equipment/Casualty Report File.

PB83-102962 CP **T03**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base (1976 Incident Report File).
Data file,
Bennie Johnson. 31 Dec 76, mag tape FEMA/DF-82/009
Source tape is in EBCDiC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Software for processing is available.

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PB83-102970 CP **T03**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base: 1978 Incident Report File.
Data file,
Bennie Johnson. 31 Dec 78, mag tape FEMA/DF-82/011
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Software for processing is available.

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PB83-102988 CP **T04**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base: 1979 Incident Report File.
Data file,
Bennie Johnson. 31 Dec 79, mag tape FEMA/DF-82/012
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Software for processing is available.

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first is the Master File, the second is the Incident and the third is the Equipment/Casualty Report File.

PB83-102996 CP **T04**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base: 1980 Incident Report File.
Data file,
Bennie Johnson. 31 Dec 80, mag tape FEMA/DF-82/013
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Software for processing is available.

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PB83-103002 CP **T02**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base: 1975 Incident Report File.
Data file,
Bennie Johnson. 31 Dec 75, mag tape FEMA/DF-82/008
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Software for processing is available.

The U.S. Fire Administration established the National Fire Incident Reporting System for the collection of fire incident and fire casualty data on a nationwide basis. NFIRS is the center of the National Fire Data Center's program which has as one of its primary goals assisting state and local governments and other critical groups in the development of their own fire data systems, and in the use and interpretation of their data. NFIRS contributes to the second major goal of the Data Center, as well; this is to determine the magnitude and characteristics of the U.S. fire problem in sufficient detail and accuracy to guide fire protection decisions of various levels of government and the private sector, and help identify solutions to the problems identified. The NFIRS data contains tthre files. The first is the Master File, the second is the Incident and the third is the Equipment/Casualty Report File.

PB83-103010 CP **T04**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base: 1981 Incident Report File.
Data file,
Bennie Johnson. 31 Dec 81, mag tape FEMA/DF-82/014
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Software for processing is available.

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PB83-103028 CP **T02**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base: 1981 Equipment/Casualty Report File.
Data file,
Bennie Johnson. 31 Dec 81, mag tape FEMA/DF-82/020
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Software for processing is available.

The U.S. Fire Administration established the National Fire Incident Reporting System for the collection of fire incident and fire casualty data on a nationwide basis. NFIRS is the center of the National Fire Data Center's program which has as one of its primary goals assisting state and local governments and other critical groups in the development of their own fire data systems, and in the use and interpretation of their data. NFIRS contributes to the second major goal of the Data Center, as well; this is to determine the magnitude and characteristics of the U.S. fire problem in sufficient detail and accuracy to guide fire protection decisions of various levels of government and the private sector, and help identify solutions to the problems identified. The NFIRS data contains three files. The first is the Master File, the second is the Incident and the third is the Equipment/Casualty Report File.

PB83-103036 CP **T02**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base: 1980 Equipment/Casualty Report File.
Data file,
Bennie Johnson. 31 Dec 80, mag tape FEMA/DF-82/019
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Software for processing is available.

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PB83-103044 CP **T07**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base: 1981 Master File.
Data file,
Bennie Johnson. 31 Dec 81, mag tape FEMA/DF-82/007
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Software for processing is available.

The U.S. Fire Administration established the National Fire Incident Reporting System for the collection of fire incident and fire casualty data on a nationwide basis. NFIRS is the center of the National Fire Data Center's program which has as one of its primary goals assisting state and local governments and other critical groups in the development of their own fire data systems, and in the use and interpretation of their data. NFIRS contributes to the second major goal of the Data Center, as well; this is to determine the magnitude and characteristics of the U.S. fire problem in sufficient detail and accuracy to guide fire protection decisions of various levels of government and the private sector, and help identify solutions to the problems identified. The NFIRS data contains three files. The first is the Master File, the second is the Incident and the third is the Equipment/Casualty Report File.

PB83-103093 CP **T03**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base: 1975 Master File.
Data file,
Bennie Johnson. 31 Dec 75, mag tape FEMA/DF-82/001
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Software for processing is available.

The U.S. Fire Administration established the National Fire Incident Reporting System for the collection of fire incident and fire casualty data on a nationwide basis. NFIRS is the center of the National Fire Data Center's program which has as one of its primary goals assisting state and local governments and other critical groups in the development of their own fire data systems, and in the use and interpretation of their data. NFIRS contributes to the second major goal of the Data Center, as well; this is to determine the magnitude and characteristics of the U.S. fire problem in sufficient detail and accuracy to guide fire protection decisions of various levels of government and the private sector, and help identify solutions to the problems identified. The NFIRS data contains three files. The first is the Master File, the second is the Incident and the third is the Equipment/Casualty Report File.

PB83-103101 CP **T02**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base: 1977 Equipment/Casualty File.
Data file,
Bennie Johnson. 31 Dec 77, mag tape FEMA/DF-82/016
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Software for processing is available.

The U.S. Fire Administration established the National Fire Incident Reporting System for the collection of fire incident and fire casualty data on a nationwide basis. NFIRS is the center of the National Fire Data Center's program which has as one of its primary goals assisting state and local governments and other critical groups in the development of their own fire data systems, and in the use and interpretation of their data. NFIRS contributes to the second major goal of the Data Center, as well; this is to determine the magnitude and characteristics of the U.S. fire problem in sufficient detail and accuracy to guide fire protection decisions of various levels of government and the private sector, and help identify solutions to the problems identified. The NFIRS data contains three files. The first is the Master File, the second is the Incident and the third is the Equipment/Casualty Report File.

PB83-103119 CP **T04**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base: 1977 Incident Report File.
Data file,
Bennie Johnson. 31 Dec 77, mag tape FEMA/DF-82/010
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Software for processing is available.

The U.S. Fire Administration established the National Fire Incident Reporting System for the collection of fire

incident and fire casualty data on a nationwide basis. NFIRS is the center of the National Fire Data Center's program which has as one of its primary goals assisting state and local governments and other critical groups in the development of their own fire data systems, and in the use and interpretation of their data. NFIRS contributes to the second major goal of the Data Center, as well; this is to determine the magnitude and characteristics of the U.S. fire problem in sufficient detail and accuracy to guide fire protection decisions of various levels of government and the private sector, and help identify solutions to the problems identified. The NFIRS data contains three files. The first is the Master File, the second is the Incident and the third is the Equipment/Casualty Report File.

PB83-103127 CP **T02**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base: 1978 Equipment/Casualty Report File.
Data file,
Bennie Johnson. 31 Dec 78, mag tape FEMA/DF-82/017
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Software for processing is available.

The U.S. Fire Administration established the National Fire Incident Reporting System for the collection of fire incident and fire casualty data on a nationwide basis. NFIRS is the center of the National Fire Data Center's program which has as one of its primary goals assisting state and local governments and other critical groups in the development of their own fire data systems, and in the use and interpretation of their data. NFIRS contributes to the second major goal of the Data Center, as well; this is to determine the magnitude and characteristics of the U.S. fire problem in sufficient detail and accuracy to guide fire protection decisions of various levels of government and the private sector, and help identify solutions to the problems identified. The NFIRS data contains three files. The first is the Master File, the second is the Incident and the third is the Equipment/Casualty Report File.

PB83-103135 CP **T02**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base: 1979 Equipment/Casualty File.
Data file,
Bennie Johnson. 31 Dec 79, mag tape FEMA/DF-82/018
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Software for processing is available.

The U.S. Fire Administration established the National Fire Incident Reporting System for the collection of fire incident and fire casualty data on a nationwide basis. NFIRS is the center of the National Fire Data Center's program which has as one of its primary goals assisting state and local governments and other critical groups in the development of their own fire data systems, and in the use and interpretation of their data. NFIRS contributes to the second major goal of the Data Center, as well; this is to determine the magnitude and characteristics of the U.S. fire problem in sufficient detail and accuracy to guide fire protection decisions of various levels of government and the private sector, and help identify solutions to the problems identified. The NFIRS data contains three files. The first is the Master File, the second is the Incident and the third is the Equipment/Casualty Report File.

PB83-103143 CP **T05**
Federal Emergency Management Agency, Washington, DC.
National Fire Incident Reporting System (NFIRS) Data Base: 1977 Master File.
Data file,
Bennie Johnson. 31 Dec 77, mag tape FEMA/DF-82/003
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Software for processing is available.

The U.S. Fire Administration established the National Fire Incident Reporting System for the collection of fire incident and fire casualty data on a nationwide basis. NFIRS is the center of the National Fire Data Center's program which has as one of its primary goals assisting state and local governments and other critical groups in the development of their own fire data systems, and in the use and interpretation of their data. NFIRS contributes to the second major goal of the Data Center, as well; this is to determine the magnitude and characteristics of the U.S. fire problem in sufficient detail and accuracy to guide fire protection decisions of various levels of government and the private sector, and help identify solutions to the problems identified. The NFIRS data contains three files. The first is the Master File, the second is the Incident and the third is the Equipment/Casualty Report File.

PB83-112656 PC **A05**/MF **A01**
Applied Science Associates, Inc., Valencia, PA.
Experimental Field Test of Proposed Anti-Dart-Out Training Programs. Volume 1. Conduct and Results.
Final rept. Jun 74-Dec 80,
Richard L. Dueker. Dec 81, 95p ASA-484-VOL-1, DOT-HS-806 195
Contract DOT-HS-4-00955
See also Volume 2, PB83-112664.

This report describes the conduct and results of an evaluation of a child pedestrian anti-dart-out training program. Two versions were tested: A film program and a film/simulator program. Before/after accident and street crossing behavior data were collected in one city for each program, and in a comparison city. Accident data were collected in two additional comparison cities. Data on student/teacher reactions and deviations in the conduct of the program were also collected.

PB83-112664 PC **A08**/MF **A01**
Applied Science Associates, Inc., Valencia, PA.
Experimental Field Test of Proposed Anti-Dart-Out Training Programs. Volume 2. Implementation Guidelines and Program Materials.
Final rept. Jun 74-Dec 80,
Richard L. Dueker, and Sophie S. Berger. Dec 81, 158p ASA-484-VOL-2, DOT-HS-806 196
Contract DOT-HS-4-00955
See also Volume 1, PB83-112656.

This report (Volume 2 of three volumes) provides detailed descriptions of all program materials employed with the recommended version of a child pedestrian safety program. This volume is designed to serve as a users guide for school systems implementing the program. It provides complete, organized information on every aspect of the program. Implementation guidelines are provided and issues of concern to users are discussed. The full texts of the program guides which specify program content and conduct are provided. Copies of all other printed materials are included. Specifications for other program materials are provided and possible alternatives are discussed.

PB83-112730 PC **A17**/MF **A01**
National Bureau of Standards, Washington, DC.
Fire Research and Safety - Proceedings of the Fifth Joint Panel Meeting of the U.S. - Japan Cooperative Program in Natural Resources Held at the National Bureau of Standards, Gaithersburg, Maryland, October 15-24, 1980.
Final rept.,
Joyce E. Chidester. Sep 82, 397p NBS-SP-639
See also PB81-203317. Library of Congress catalog card no. 82-600580.

The Fifth Joint Panel Meeting of the United States - Japan Panel on Natural Resources (UJNR), Fire Research and Safety, was held at the National Bureau of Standards in Gaithersburg, MD, from October 15 through 24, 1980. The meeting consisted of in-depth technical sessions on arson and fire investigation, toxicity of combustion products, advances in sprinkler technology, and fire modeling. Progress reports briefly covered fire retardance, building design, smoke control, human behaviors in fires, and fire protection. Two days of informal sessions were held on toxicity, human behavior, detection and smoke properties, sprinklers, smoldering, and fire modeling. This meeting was held in conjunction with the Center for Fire Research's Annual Conference which included United States presentations of related technical subjects. The proceedings include the technical papers presented at the UJNR meeting along with the ensuing discussion and the summary reports prepared by each session chairperson.

PB83-113092 PC **A05**/MF **A01**
Nederlands Inst. voor Praeventieve Gezondheidszorg TNO, Leiden.
Veiligheid van Kinderen in Woonwijken. Deel 3: Een Onderzoek naar de Geldigheid van de Konfliktmethode (Safety of Children in Residential Areas. Part 3: A Study on the Validity of the Conflict Method),
V. A. Guettinger. Nov 79, 90p
Text in Dutch.

In this third report, the prediction value of the conflict observation technique is discussed: 'Is there such a relationship between serious conflicts of children as pedestrians with motor traffic and collisions in which children are involved as pedestrians that the conflict observation technique may be applied to determine the relative safety or lack of safety of residential neighborhoods for young pedestrians.' Since only part of all collisions in which young pedestrians are involved are registered and since accidents of young pedestrians in residential neighborhoods are relatively rare, the question cannot be fully examined. On the basis of statistics on accidents during the period 1972 through 1976, 25 road sections were selected for study. Two demands were formulated with regard to a possible connection between serious conflicts and registered accidents. Results show that if there is a good relationship between the subjective impressions of traffic safety and the objective traffic safety (accidents), the existence of an instrument such as the conflict technique is questionable.

PB83-113126 PC **A05**/MF **A01**
Technische Hogeschool, Delft (Netherlands).
Een Nieuwe Weg Naar Veiligheid (A New Way to Safety),
Ben Quist. May 81, 76p
Text in Dutch.

The study reviews the long history of traffic accidents, resulting from many factors including human error, and also other inconveniences caused by vehicular traffic. The question of safety is discussed. The review covers the period from the end of the 19th Century to World War I, the period from World War II to the present. The study also takes a look at the future with respect to the need for safety measures in many facets of the problem including such things as the emission of harmful substances.

13M. Structural Engineering

AD-A119 498/4 PC **A03**/MF **A01**
Army Materials and Mechanics Research Center, Watertown, MA.
Proceedings of the Army Symposium on Solid Mechanics, 1982 - Critical Mechanics Problems in Systems Design. Supplement.
Final rept.
Sep 82, 27p Rept no. AMMRC-MS-82-4-SUPP
Supplement to AD-A119 510.

The U.S. Army at Natick (NLABS) is presently conducting a program to develop a nuclear hardened, mobile, tactical shelter which would be used to house C3 systems. As part of this program, a prototype shelter was designed to withstand a blast loading corresponding to a 10.0 psi (68.9-kPa) incident overpressure. The hardened shelter was then constructed, instrumented and subjected to a simulated nuclear blast loading at the MILL RACE test, White Sands Missile Range, New Mexico. The principal objectives of the test were to evaluate analytical methods for predicting shelter structural effects and shelter overturning effects induced by blast loading and to assess the validity of a particular design concept using conventional materials. Comparison of measured predicted values of shelter wall strain and shelter overturning motion confirm the validity of the analytical methods used. Test results demonstrated that a design featuring shear stiffened sandwich panels with aluminum face materials could withstand a nominal 10.0 psi incident shock loading. (Author)

AD-A119 526/2 PC **A05/MF A01**
Naval Facilities Engineering Command, Alexandria, VA.
Ferry Terminals and Small Craft Berthing Facilities. Design Manual 25.5.
Final design criteria.
Jul 81, 100p Rept no. NAVFAC-DM-25.5

Basic criteria for design of ferry terminals, small-craft berthing facilities, and degaussing and deperming facilities are presented herein for use by experienced port, coastal, and construction engineers and constructors. The contents cover general siting, layout, and environmental considerations and requirements, specific criteria for design of ferry terminals, small-craft berthing systems, support facilities, protective structures and features, and major design problems associated therewith. (Author)

AD-A119 595/7 PC **A03/MF A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Conduction Phase Change Beneath Insulated Heated or Cooled Structures.
Virgil J. Lunardini. Aug 82, 48p Rept no. CRREL-82-22

The problem of thawing beneath heated structures on permafrost (or cooled structures in non-permafrost zones) must be addressed if safe engineering designs are to be conceived. In general, there are no exact solutions to the problem of conduction heat transfer with phase change for practical geometries. The quasi-steady approximation is used here to solve the conductive heat transfer problem with phase change for insulated geometries including infinite strips, rectangular buildings, circular storage tanks, and buried pipes. Analytical solutions are presented and graphed for a range of parameters of practical importance. (Author)

DE82015144 PC **A02/MF A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Effects of Guy Wires on SWECS Tower Dynamics. Technical Report.
C. P. Butterfield, K. R. Pykkonen, and J. H. Sexton.
Jul 80, 16p RFP-3323
Contract AC04-76DP03533

The Rocky Flats (RF) Supporting Research and Technology (SRT) study for tower testing/analysis has led to some useful information concerning the effect of tower guy pretension on small wind system tower dynamics. The effect of guy-wire pretension on tower natural frequencies is usually considered negligible if the guy: (1) has no sag caused by gravity, and (2) the tension is not approaching the tower buckling load. At the rf test center it was found that, for the test tower even when these conditions were avoided, the guy fundamental frequency must be 30% greater than the tower fundamental frequency to maintain the fundamental's characteristics.

PB83-111385 PC **A07/MF A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Investigation of Construction Failure of Harbour Cay Condominium in Cocoa Beach, Florida.
Final rept.,
H. S. Lew, N. J. Carino, S. G. Fattal, and M. E. Batts.
Aug 82, 140p NBS-BSS-145
Supersedes PB82-117409. Library of Congress catalog card no. 82-600566.

The investigation of the collapse of a five-story reinforced concrete flat-plate structure under construction at Cocoa Beach, Florida is presented in this report. The investigation included onsite inspection, laboratory tests and analytical studies. Based on the results of this investigation, it is concluded that the most probable cause of the failure was insufficient punching shear capacity in the fifth-floor slab to resist the applied construction loads.

PB83-117382 PC **A12/MF A01**
Little (Arthur D.), Inc., Cambridge, MA.
Evaluation of Existing Programs for Simulation of Residential Building Energy Use.
Final rept.,
R. L. Merriam, and R. J. Rancatore. c1982, 255p
GRI-81/0047, EPRI/EA-2575
Contract GRI-5014-341-0289

A review and evaluation of residential building energy analysis programs is carried out in six steps: (1) survey of the experience and needs of electric and gas utilities in residential building energy analysis; (2) identification and characterization of currently available programs capable of residential energy use analysis; (3) examination and summary of the intended capabilities of ten programs; (4) indepth analysis of the engineering bases of five programs; (5) test of the same five programs; and (6) establishing the strengths and limitations of the programs. Classification of the various analysis methods for estimating residential energy use is provided as a background for the study. The report includes a summary of the history of the development of the various programs and presents a discussion of the various thermal loads algorithms commonly employed.

PB83-852376 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Port and Harbor Safety. 1974-October, 1982 (Citations from Oceanic Abstracts).
Rept. for 1974-Oct 82.
Oct 82, 124p
Supersedes PB82-857939.Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

This bibliography contains citations concerning the safety aspects for the design and operations of ports and harbors, including deepwater terminals. Design includes port access and approach; currents, tides and configuration, including breakwaters; and risk analysis. Operational aids to safety include traffic control and communications, firefighting, security, and ancillary equipment, such as tugs and cargo handling equipment. Some of the literature pertains to minimizing hazardous risks inherent in some cargoes, such as chemicals and LNG. There are a few abstracts which reference literature on vessel traffic data, special ports for typhoon havens, and harbor accident reports. Some of the abstracts reference national and international conferences. (This updated bibliography contains 141 citations, 22 of which are new entries to the previous edition.)

14.

METHODS AND EQUIPMENT

14A. Cost Effectiveness

AD-A119 788/8 PC **A10/MF A01**
Clemson Univ., SC. Dept. of Industrial Management.
Cost Functions for Airframe Production Programs.
Final rept.,
N. Keith Womer, and Thomas R. Gulledge. Jul 82, 201p
Contracts F33615-81-K-5116, N00014-75-C-0451

The research objectives were: (a) develop, test, and illustrate the use of a significant new approach to estimating the cost of an airframe production program using already collected data on Air Force airframes; and (b) provide the Air Force with a calibrated tool capable of providing timely answers to significant problems of program management. The researcher developed a model based on the four production cost drivers of learning by doing, learning over time, the speed of the production line, and production line length. It focuses on the production of an individual airframe as a function of its start date and its planned delivery date, and includes technical features of both the airframe production program and the contractor's behavior. The model is estimated from data on the C-141 program, and is used to evaluate the effect of several small changes to the delivery schedule for the C-141. This analysis shows the sensitivity of the model to delivery schedule changes. It also illustrates one of the important ways that the model may be used in program management. A detailed investigation of estimating the model on data from other programs revealed that its parameters are very stable from one program to another, and the parameters can be estimated from early actual data on a new program. Ways to combine the model with a cost estimating relation (CER) and update these estimates with early actual data are discussed in this report. These techniques are applied to data from the F-102 program and the F-5/T-38 program.

14B. Laboratories, Test Facilities, and Test Equipment

AD-A119 479/4 PC **A02/MF A01**
Georgia Univ., Athens. Dept. of Biochemistry.
Calibrated Chemiluminescence Standards.
Rept. for May-Aug 82,
John Lee, Iain B. C. Matheson, J. R. Losee, and Edward F. Zalewski. Aug 82, 12p
Contract N00014-82-K-0440

The aim of this project was to provide an absolute photometric calibration for an underwater photometer in use at the Naval Oceans Systems Center in San Diego. This was made by using as a reference light standard, the chemiluminescence reaction of luminol. The quantum yield of this chemiluminescence is known. Since it was not possible to conveniently initiate the chemiluminescence reaction within the underwater photometer, it was first necessary to develop a liquid light standard which could be used for substitution. A recipe was developed for making a suspension of luminous bacteria that would emit light at a constant rate for about 30 minutes. Its photon emission rate could be easily determined using a second photometer calibrated against luminol. In the second part of the project an attempt was made to verify the published quantum yield of the luminol chemiluminescence using the new siilcon photodiode absolute photometer now available at the National Bureau of Standards. The results show satisfactory agreement with the previous measurements but the measurements are still preliminary and significant optical problems still need to be resolved. (Author)

AD-A119 544/5 PC **A03/MF A01**
Aeronautical Research Labs., Melbourne (Australia).
Design of a New Contraction, Wide Angle Diffuser and Flow Manipulators for the Low Speed Wind Tunnel.
Technical memo.,
J. B. Willis, and I. A. Hunt. Jun 82, 27p Rept no. ARL/AERO-TM-340

It is over forty years since the A.R.L. low speed wind tunnel was built, and the quality of the flow in the test section is inadequate by today's standards. This memorandum describes the design of a new contraction, wide angle diffuser and flow manipulators, to improve the flow in this tunnel. These modifications should substantially improve the velocity distribution and reduce turbulence levels with only a small reduction in top speed of the tunnel. A useful increase in the length of the test section has also been obtained. (Author)

AD-A119 635/1 PC **A03/MF A01**
SRI International, Menlo Park, CA.
Investigation of Mechanisms in Field-Desorbed Ion Formation Using a Pulsed Field Desorption Time-of-Flight Mass Spectrometer.
Final technical rept. 15 Aug 78-19 Nov 81,
S. E. Buttrill, Jr. Aug 82, 44p ARO-15893.2-LS
Contract DAAG29-78-C-0034

A pulsed field desorption time-of-flight mass spectrometer was designed and tested. Second-order energy focusing was achieved using a two-stage electrostatic reflector. Ions were formed by applying a 80-150 ns negative pulse of 2200 volts to a counter electrode spaced 50-200 micrometers away from either silicon or carbon activated emitters. The interaction of the high voltage pulse with the ion packet caused a large spread in the ion energy and limited mass resolution to only 400 at m/z 152. In separate experiments using a pulsed laser to produce ions, a time resolution of 1450 was obtained at m/z 242. (Author)

AD-A119 705/2 PC **A02**/MF **A01**
Stanford Univ., CA. Edward L. Ginzton Lab. of Physics.
Acoustic Microscopy at Cryogenic Temperatures.
Annual summary rept. 1 Jul 81-30 Jun 82,
C. F. Quate, and J. S. Foster. Aug 82, 15p Rept no. GL-3481
Contract N00014-77-C-0412

This report described our progress on very high resolution acoustic microscopy in very low temperature liquid helium. During the past year we have recorded the first acoustic images at temperatures less than .2 K. The acoustic wavelength in helium was 2400 A, which was the shortest ever used in acoustic imaging. After several improvements to the microscope were made, the helium acoustic wavelength was reduced to 900 A and images recorded with sub-1000 A resolution. (Author)

DE82004931 MF **A01**
Science Applications, Inc., La Jolla, CA.
Maintenance Manual gamma Ray Gauge System.
V. V. Verbinski. 9 Dec 81, 60p SAI-272-81-419LJ
Contract AC21-79MC11136
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Instructions on the maintenance and operation of a gamma-ray gauge system which controls the density and level of product in a vessel are presented. These gauges are used in coal gasification reactors at the Morgantown Energy Technology Center. The general description includes diagrams and explanations of the detectors, sources, display panel, and trip-level settings. A detailed description of the densitometer/point-level gauges including circuit diagrams and calibration instructions are also presented. (ERA citation 07:045563)

DE82008839 MF **A01**
Oak Ridge National Lab., TN.
Decalibration of Sheathed Thermocouples.
R. L. Anderson, J. D. Lyons, T. G. Kollie, W. H. Christie, and R. Eby. 1982, 75p CONF-820306-6
Contract W-7405-ENG-26
Symposium on temperature, Washington, DC, USA, 14 Mar 1982.
Available in microfiche only.

The decalibration of sheathed thermocouples at high temperatures has been studied by a variety of methods including inhomogeneity testing, calibration, metallography, and an ion microprobe mass analyzer. The results clearly show that the sheathed thermocouple is a complex system at elevated temperatures and that the thermoelements can be contaminated by the diffusion of materials through the insulation from the sheath. Decalibration of base-metal thermocouples is more severe in stainless steel sheaths than in high-nickel alloy sheaths such as Inconel 600. Decalibration tests have been run on Chromel versus Alumel and Nicrosil versus Nisil in vacuum and in argon atmospheres with both sheathed assemblies and bare wire. The decalibrations of both types of thermocouples are similar under these conditions. (ERA citation 07:047922)

DE82010954 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Calibration Procedure: John Fluke 8600A Digital Multimeter.
D. L. Bintliff. 10 Nov 81, 8p HEDL-7112
Contract AC06-76FF02170

This procedure provides information for the periodic calibration of the John Fluke Co. 8600A Digital Multimeter using the JF5101A calibrator. (ERA citation 07:044576)

DE82011053 MF **A01**
Lawrence Livermore National Lab., CA.
X-Ray Microscope Assemblies. Final Report and Metrology Report.
T. F. Zehnpfennig. 13 Apr 81, 129p UCRL-15408, VI-588
Contract W-7405-ENG-48
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This is the Final Report and Metrology Report prepared under Lawrence Livermore Laboratory Subcontract 9936205, X-ray Microscope Assemblies. The purpose of this program was to design, fabricate, and perform detailed metrology on an axisymmetric grazing-incidence x-ray microscope (XRMS) to be used as a diagnostic instrument in the Lawrence Livermore Laser Fusion Program. The optical configuration chosen for this device consists of two internally polished surfaces of revolution: an hyperboloid facing the object; and a confocal, co-axial elliposid facing the image. This arrangement is known as the Wolter Type-I configuration. The grazing angle of reflection for both surfaces is approximately 1 exp 0 . The general optical performance goals under this program were to achieve a spatial resolution in the object plane in the soft x-ray region of approximately 1 micron, and to achieve an effective solid collecting angle which is an appreciable fraction of the geometric solid collecting angle. (ERA citation 07:045307)

DE82012514 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Ultrasonic Test-Bed Requirements.
B. J. McKinley. Jan 81, 34p UCID-18896
Contract W-7405-ENG-48

The functional requirements for an ultrasonic imaging system, using methods requiring either one or two transducers, are described under two general categories: mechanical and electronic. The mechanical requirements are that the motions of the transducers and test object be versatile and accurate. The electronic components must also be versatile and enhance the operator's ability to perform needed quantitative evaluations of a wide variety of materials and assemblies. Therefore, data acquisitions and analyses and graphic displays of results must be easily controlled. The operator is then relieved of concentrating on routine tasks and is free to evaluate results using the tools available in the system. A description of the functional requirements for the ultrasonic test bed project at Lawrence Livermore National Laboratory is detailed in this report. (ERA citation 07:044430)

DE82012908 MF **A01**
Department of Energy, Argonne, IL. New Brunswick Lab.
DOE Research and Development Report. Progress Report, October 1980-September 1981.
Mar 82, 69p NBL-304
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The DOE New Brunswick Laboratory (NBL) is the US Government's Nuclear Materials Standards and Measurement Laboratory. NBL is assigned the mission to provide and maintain, as an essential part of federal statutory responsibilities related to national and international safeguards of nuclear materials for USA defense and energy programs, an ongoing capability for: the development, preparation, certification, and distribution of reference materials for the calibration and standardization of nuclear materials measurements; the development, improvement, and evaluation of nuclear materials measurement technology; the assessment and evaluation of the practice and application of nuclear materials measurement technology; expert and reliable specialized nuclear materials measurement services for the government; and technology exchange and training in nuclear materials measurement and standards. Progress reports for this fiscal year are presented under the following sections: (1) development or evaluation of measurement technology (elemental assay of uranium plutonium; isotope composition); (2) standards and reference materials (NBL standards and reference materials; NBS reference materials); and (3) evaluation programs (safeguards analytical laboratory evaluation; general analytical evaluation program; other evaluation programs). (ERA citation 07:046043)

DE82013467 MF **A01**
Oak Ridge National Lab., TN.
Quantitative Determination of Chrysotile Asbestos in Building Materials by X-Ray Diffractometry.
J. H. Stewart, and H. W. Dunn. 1982, 23p CONF-820418-10
Contract W-7405-ENG-26
UCC-ND and GAT environmental protection seminar, Gatlinburg, TN, USA, 5 Apr 1982.
Best available copy from document source. Available in microfiche only.

An x-ray diffractometry technique using an internal standard has been developed for the quantitative measurement of the chrysotile asbestos content of a wide variety of construction materials. This technique is simple and cost effective compared with thre usual need for combined x-ray powder diffraction patterns and optical or transmission electron microscopy to determine the asbestos content of materials. The diffractometry method is designed to differentiate between construction materials which are not asbestos contaminated and those which require costly special handling to ensure employee safety. The asbestos concentration range between 0.5 and 5.0 percent was initially investigated to meet the 1.0 percent asbestos Environmental Protection Agency National Emission Standards regulation, and has now been extended to determine as much as 50% chrysotile.

DE82013520 MF **A01**
Lawrence Livermore National Lab., CA.
Plan to Develop Field Capabilities for Fiber-Optic Experiments.
W. E. Cooper, and L. L. Moon. 1 Apr 82, 45p UCID-19357
Contract W-7405-ENG-48
Portions of document are illegible.
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Brief descriptions are given of some typical optical-fiber experiments, such as high speed digital data link experiments, fiber optics alpha measurements, and time resolved experiments with streak camera recording. New equipment, facilities, and operational procedures required for such experiments are listed, and needed measurement capabilities are expanded upon. Resources required to support optical fiber based experiments in the field on a routine basis are determined. Finally, the equipment and facility expenditures required, including manpower as well as cost, are listed. The work is to be applied to underground nuclear explosives diagnostics. (ERA citation 07:044587)

DE82013542 MF **A01**
Oak Ridge National Lab., TN.
Quantification of Surface Contamination: Principles and Applications.
T. Vo-Dinh. 1982, 18p CONF-820411-6
Contract W-7405-ENG-26
Institute of Environmental Sciences conference, Atlanta, GA, USA, 20 Apr 1982.
Available in microfiche only.

The applications discussed in this paper underscore the usefulness and versatility of molecular luminescence spectroscopy as an efficient surface detection technique. The technique can be used not only as a qualitative characterization method, but also as a quantitative analytical tool to detect trace contaminants on surfaces. Recent advances in instrumentation and methodology have expanded the applicability of surface luminescence into many new problem areas. Trace organics are emphasized here. (ERA citation 07:044636)

DE82015072 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Apparatus for Dynamic Measurement of Gases Released from Materials Heated under Programmed Temperature-Time Control.
J. W. Early, and R. M. Abernathey. Apr 82, 14p LA-9298-MS
Contract W-7405-ENG-36
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This apparatus, a prototype of one being constructed for hotcell examination of irradiated nuclear materials, measures dynamic release rates and integrated volumes of individual gases from materials heated under controlled temperature-time programs. It consists of an inductively heated vacuum furnace connected to a quadrupole mass spectrometer. A computerized control system with data acquisition provides scanning rates down to 1s and on-line tabular and graphic displays. Heating rates are up to 1300 exp 0 C/min to a maximum temperature of 2000 exp 0 C. The measurement range is about 10 exp -6 to 10 exp -2 torr-liter/s for H sub 2 , CH sub 4 , H sub 2 O, N sub 2 , and CO and 10 exp -8 to 10 exp -2 torr-liter/s for He, Kr, and Xe. Applications are described for measurements of Kr and Xe in mixed oxide fuel, various gases in UO sub 2 pellets, and He in exp 238 PuO sub 2 power and heat sources.

DE82015514 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.

Elementary Approach to the Six-Port Reflectometer, Its Theory and Implementation.
R. D. Moyer. Apr 82, 17p SAND-81-2651
Contract AC04-76DP00789

Over the past decade, the theory and performance of the six-port reflectometer as a basis for network analysis measurements have been developed to a very high degree. The relatively complex theory is well documented in a sizable body of literature. In this paper, the key ideas from several sources in the literature are brought together and presented in a way which hopefully helps one develop a satisfying intuitive feel for just how a six-port reflectometer operates. In addition, suggestions are made which should allow many laboratories to appropriate the advantages of the six-port reflectometer (in a limited way) without the necessity of a large capital outlay.

DE82015829 PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Reproducibility of an Automated Laser Raman System for Light-Gas Analysis.
P. A. Spangler, and C. J. Seliskar. 27 May 82, 16p MLM-2804
Contract AC04-76DP00053
Microfiche only after original copies are exhausted.

The experimental design, method of data collection, and subsequent analysis of an experimental laser Raman system are described. Results describe the feasibility of application of this system for light gas analysis. It is shown that the 1-sigma standard deviation reproducibilities of 0.03% can be obtained for major isotopic components (97%) and 0.9% reproducibility for a 12.3% component. Gases present at 0.49% can be analyzed with better than 4% reproducibility.

DE82700761 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Device with a Superconducting Transformer for Measuring Volt-Ampere Characteristics of High-Current Superconductors.
L. S. Shirshov, and G. Ehnderiejn. 1980, 12p IFVE-OUNK-80-137
In Russian.
U.S. Sales Only.

A device, designed to measure volt-ampere characteristics of high-current superconductors in a magnetic field is described. A superconducting transformer is used to obtain high currents and to reduce heat flow into the cryostat. Current up to 180 A from a stabilized power supply is introduced into the primary transformer winding, resulting in currents in the secondary winding up to 11000 A. The current in a superconducting sample is measured with the help of induction coils. The error in current measurement does not exceed +- 2%. Application of the transformer provides sample protection from burning-out in the transition moment. The magnetic field up to 8 T is created by a superconducting solenoid with 40 mm aperture. The device can be put into the cold magnet, that allowing rapid replacement of the sample. (Atomindex citation 13:651898)

N82-31509/4 PC **A04**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Physics.
Ion Beam Microtexturing and Enhanced Surface Diffusion.
Final Report.
R. S. Robinson. Feb 82, 54p NAS 1.26:167948, NASA-CR-167948
Contract NAG3-43

Ion beam interactions with solid surfaces are discussed with particular emphasis on microtexturing induced by the deliberate deposition of controllable amounts of an impurity material onto a solid surface while simultaneously sputtering the surface with an ion beam. Experimental study of the optical properties of microtextured surfaces is described. Measurements of both absorptance as a function of wavelength and emissivity are presented. A computer code is described that models the sputtering and ion reflection processes involved in microtexture formation.

N82-31603/5 PC **A07**/MF **A01**
Aeritalia S.p.A., Turin (Italy).
Investigation for an Automated Electromagnetic Field Generating System, Volume 1.
Final Report.
B. Audone, and G. Gerbi. 1982, 148p ESA-CR(P)-1584-V-1
Contract ESTEC-4509/80/NL-PP(SC)

The feasability of an automated electromagnetic field generating system (AEFGS) able to perform the radiated susceptibility, electromagnetic compatability test was studied. An AEFGS which covers the frequency range from 10 kHz to 40 GHz, generating a minimum electric field of 100V/m, 1m from the antennas was specified. Specifications can be met, except for maximum obtainable electric field intensity and for amplifier harmonic output. The 100V/m field in the frequency range from 10 kHz to 70 MHz can be obtained if a 10 kw amplifier replaces the suggested 2 kw one. A TWT amplifier is recommended for the 18 to 40 GHz range.

N82-31604/3 PC **A06**/MF **A01**
Aeritalia S.p.A., Turin (Italy).
Investigation for an Automated Electromagnetic Field Generating System (Aefgs). Volume 2: Instrumentation Data Sheets Collection, Annex.
Final Report.
1982, 102p ESA-CR(P)-1584-V-2
Contract ESTEC-4509/80/NL-PP(SC)
Brochures Supplement.

Manufacturers' literature concerning equipment for an automated electromagnetic field generator system (to be used in radiated susceptibility tests) is presented. Information on synthesizers, amplifiers, oscillators, meters, attenuators, directional couplers, and coaxial/waveguide switches is given.

N82-31661/3 PC **A06**/MF **A01**
Old Dominion Univ., Norfolk, VA. Dept. of Physics.
Radiation Effects Studies for the High-Resolution Spectrograph.
Progress Report.
L. C. Smith, and J. Becher. Aug 82, 110p NAS 1.26:169273, PTR-82-8, NASA-CR-169273
Grant NSG-5289

The generation and collection of charge carriers created during the passage of energetic protons through a silicon photodiode array are modeled. Pulse height distributions of noise charge collected during exposure of a digicon type diode array to 21 and 75 MeV protons were obtained. The magnitude of charge collected by a diode from each proton event is determined not only by diffusion, but by statistical considerations involving the ionization process itself. Utilizing analytical solutions to the diffusion equation for transport of minority carriers, together with the Vavilov theory of energy loss fluctuations in thin absorbers, simulations of the pulse height spectra which follow the experimental distributions fairly well are presented and an estimate for the minority carrier diffusion length L sub d is provided.

N82-31663/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Development and Utilization of a Laser Velocimeter System for a Large Transonic Wind Tunnel.
R. J. Freedman, and J. P. Greissing. Jun 82, 17p NAS 1.15:82886, E-1264, NASA-TM-82886

The need for measurements of the velocity flow field about spinner propeller nacelle configurations at Mach numbers to 0.8 was met by a specially developed laser velocimeter system. This system, which uses an argon ion laser and 4 beam 2 color optics, was required to operate in the hostile environment associated with the operation of a large transonic wind tunnel. To overcome the conditions present in locating the sensitive optics in close proximity to the wind tunnel, an isolation system was developed. The system protects the velocimeter from the high vibrations, elevated temperatures, destructive acoustic pressures and low atmospheric pressures attendant with the operation of the wind tunnel. The system was utilized to map the flow field in front of, behind and in between the rotating blades of an advanced swept blade propeller model at a Mach number of 0.8. The data collected by the system will be used to correlate and verify computer analyses of propeller nacelle flow fields and propeller performance.

N82-31728/0 PC **A02**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Shuttle Active-Microwave Experiments (SAMEX) Program.
Executive Summary Report.
C. Elachi. 1 Jul 82, 16p NAS 1.26:169285, JPL-PUB-82-59, NASA-CR-169285
Contract NAS7-100

The Shuttle active microwave experiments (SAMEX) program is reviewed. The key implementation aspects are presented.

N82-31825/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
STS-3 Induced Environment Contamination Monitor (IECM): Quick-Look Report.
E. R. Miller, and J. A. Fountain. Jun 82, 50p NAS 1.15:82489, NASA-TM-82489

The STS-3/Induced Environment Contamination Monitor (IECM) mission is described. The IECM system performance is discussed, and IECM mission time events are briefly described. Quick look analyses are presented for each of the 10 instruments comprising the IECM on the flight of STS-3. Finally, a short summary is presented and plans are discussed for future IECM flights, and opportunities for direct mapping of Orbiter effluents using the Remote manipulator System.

N82-31850/2 PC **A06**/MF **A01**
Marquette Univ., Milwaukee, WI. Dept. of Mechanical Engineering.
Feasibility of Observer System for Determining Orientation of Balloon Borne Observational Platforms.
Final Report.
N. J. Nigro, and J. C. Gagliardi. May 82, 120p NAS 1.26:169275, NASA-CR-169275
Contract NAG1-65

An observer model for predicting the orientation of balloon borne research platforms was developed. The model was employed in conjunction with data from the LACATE mission in order to determine the platform orientation as a function of time.

N82-32134/0 PC **A02**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Infrared Radiometry Radiometria No Infravermelho.
A. S. Montes, and C. C. Ghizoni. Feb 82, 13p INPE-2323-PRE/079
In Portuguese; English Summary. Presented at the 33RD Ann. Meeting of Sbpc.

The observation of infrared radiation from the Earth to space is important in the study of meteorology and climatology. A high resolution radiometer was projected and constructed for this purpose. The spectral range was from the wavelength of 1.8 microns to 22 microns, including the 'atmospheric window' (8 to 14 microns and various bands of absorbers like water vapor, carbon dioxide and ozone. The instrument was used in a balloon and measurements were made during eight hours at an altitude of 35 km.

PAT-APPL-6-383 086 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Method of an Apparatus for Measuring Temperature and Pressure.
Patent Application.
C. L. Korb, and J. E. Kalshoven, Jr. Filed 28 May 82, 29p N82-29580/9, NASA-CASE-GSC-12558-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method and apparatus for making remote temperature and pressure measurements of air are described. For temperature measurements, a main laser beam (probe) is transmitted at a wavelength at which the gas, which may be atmospheric, has a relatively high temperature sensitive resonant absorption characteristic and a relatively low pressure sensitive absorption characteristic. For pressure measurements, the probe laser beam is transmitted at a wavelength at which the gas has a relatively high pressure sensitive absorption characteristic and a relatively low temperature sensitive absorption characteristic. In either case, a reference beam at a wavelength having a relatively non-

absorbing temperature or pressure characteristic is transmitted colinearly with the probe beam. The ratio of the two beams returned by a target, which may be particles in the gas, the gas molecules themselves or a solid or liquid reflecting surface, is obtained to cancel the common absorption and scattering effects.

PAT-APPL-6-389 319 PC **A02/MF A01**
Department of the Air Force, Washington, DC.
Method and Apparatus for Detecting and Locating Delaminations in a Transparency.
Patent Application,
Louis V. Genco. Filed 17 Jun 82, 17p AD-D009 693/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A system and method for detecting and locating defects, such as delaminations, in a multi-layer laminated transparency includes a housing having top and bottom diagnonally spaced openings with a lamp mounted in the housing for generating a light-emitting object. Optical reflections of an image of the object from interface surfaces, as well as from top and bottom surfaces, of the transparency are observed for determining the presence of a delamination in the transparency. A delamination is located by identifying a reflected image from an interface surface which is approximately as bright as reflected images from the top and bottom surfaces of the transparency. (Author)

PAT-APPL-6-392 813 PC **A02/MF A01**
Department of the Navy, Washington, DC.
Method for Measuring Material Characteristics.
Patent Application,
Walter M. Madigosky, and Gilbert F. Lee. Filed 28 Jun 82, 18p AD-D009 686/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A fast and reliable method is disclosed for measuring the dynamic mechanical properties of a material, particularly its modulus of elasticity and loss factor. By this method, the acoustic characteristics of a material can be determined. An elongate strip of material, whose properties are desired to be known, is provided with miniature accelerometers fixedly secured to its opposite ends. One end of the strip is excited by a random noise source which travels toward the other end where that end and accelerometer is allowed to move freely (unrestrained). The accelerometers measures the ratios of acceleration at two locations over an extended frequency range of 0.2 Hz to 25 KHz, and the information is processed through a fast fourier transform spectrum analyzer for determining amplitude of acceleration ratio and phase difference between the two accelerometers from which Young's modulus and loss factor for that material are determined. (Author)

PATENT-4 336 713 Not available NTIS
Department of the Air Force, Washington, DC.
Compensated Temperature Sensing Device.
Patent,
Arthur S. Meyer. Filed 6 Aug 80, patented 29 Jun 82, 5p AD-D009 722/0, PAT-APPL-6-175 794
Supersedes PAT-APPL-6-175 794, AD-D007 681.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This report describes a compensated temperature sensing device having a sensing element capable of surviving extreme operating environments while still being able to substantially instantaneously sense temperature changes. This is accomplished by incorporating within the device an auxiliary heat source which artificially heats the sensing gas within the sensing device. The amount of heat added to the device would be dependent upon the error in the sensed to actual temperature and the mass of the sensor which requires a change in temperature level.

PATENT-4 338 516 Not available NTIS
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Optical Crystal Temperature Gauge with Fiber Optic Connections.
Patent,
M. M. Sharma. Filed 12 Sep 80, patented 6 Jul 82, 9p N82-30071/6, PAT-APPL-6-186 881
Supersedes PAT-APPL-6-186 881, N81-15818 (19 - 06, p 0825).Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

An optical temperature gauge uses a semiconductor crystal with a band-edge shift property which is temperature dependent. An external narrow band light source provides optical excitation through a optical fiber and light energy thus passed through the crystal is conveyed by a second optical fiber to a light-to-electric transducers at an external location. The crystal can be located in cryogenic or other systems, to provide remote read-out. The light wavelength is varied (scanned) in a repetitive pattern in source with the instantaneous wavelength passing over the band-edge wavelength during each cycle of the scan. The timing of the crossover is related to the temperature of the crystal by electronic means. Several alternative elements of instrumentation are disclosed. A variation in the basic measurement apparatus is also disclosed, in which the band gap voltage of a light source such as a laser diode is evaluated at the time of band-edge crossover in the crystal and converted to a temperature value.

PB83-851980 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Dimensional Measurement by Laser Beam. 1975-October, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Oct 82.
Oct 82, 279p

This bibliography contains citations concerning principles, techniques, and instruments of dimensional measurement by laser beams in industry and scientific research. Laser devices and techniques are discussed in distance, displacement, position, length, angular, and thickness measurement. Measurement accuracy and environmental effects are considered. (Contains 271 citations fully indexed and including a title list.)

PB83-852467 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Dimensional Measurement by Laser Beam. 1975-October, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1975-Oct 82.
Oct 82, 93p
Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

This bibliography contains citations concerning principles, techniques, and instruments of dimensional measurement by laser beams in industry and scientific research. Laser devices and techniques are discussed in displacement and distance measurement, particle size distribution, and stress analysis in solids. Studies of aircraft structure and elastic deformations are included. (Contains 85 citations fully indexed and including a title list.)

14E. Reprography

AD-A119 493/5 PC **A02/MF A01**
Defense Mapping Agency Aerospace Center, St. Louis AFS, MO. Air Target Materials/Naval Plan Charting Div.
Tilt Determination of Non-Vertical Photography Using a Handheld Programmable Calculator,
Roberta L. Braundel, and Philip K. Alderman. 1982, 23p

An easy to use, inexpensive, and rapid system for determination of tilt in an aerial photograph has been developed at the Defense Mapping Agency Aerospace Center. Image measurements are made with a calibrated template and tube magnifier. Geodetic control points are then scaled from a large scale map source. Tilt determination is then accomplished using Church's resection on a programmable calculator, and allows for computation of surface feature lengths, widths, and heights from a single image. (Author)

N82-31662/1 PC **A03/MF A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Evaluation of an Electro-Optic Remote Displacement Measuring System.
J. H. Monteith, and M. L. Kroen. Jul 82, 29p NAS 1.15:84530, NASA-TM-84530

An instrumentation system to provide a noncontact method for measurement of target positions was evaluated. The system employs two electro-optic camera units which give stereo information for use in determining three dimensional target locations. Specially developed, infrared sensitive photodetectors are used in the cameras to sense radiation from light emitting diode targets. Up to 30 of these targets can be monitored with a sampling rate of 312 Hz per target. An important part of the system is a minicomputer which is used to collect the camera data, sort it, make corrections for distortions in the electro-optic system, and perform the necesssary coordinate transformations. If target motions are restricted to locations in a plane which is perpendicular to a camera's optical axis, the system can be used with just one camera. Calibrations performed in this mode characterize accuracies in single camera operation. This information is also useful in determination of single camera contributions to total system errors. For this reason the system was tested in both the single camera and two camera (stereo) modes of operation.

PB83-851568 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
High-Speed Photography: Applications in Research and Development. June, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 297p
Supersedes PB81-855488.

This bibliography contains citations concerning applications of high speed photography methods and technology to a wide spectrum of research and development disciplines. Various types of equipment are discussed with regard to their performance and operational techniques. (This updated bibliography contains 331 citations, 197 of which are new entries to the previous edition.)

PB83-852079 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Aerial Photography: Its Use in the Study of Coastal Erosion and Pollution. 1974-October, 1982 (Citations from Oceanic Abstracts).
Rept. for 1974-Oct 82.
Oct 82, 98p
Supersedes PB81-870818.Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

This bibliography contains citations concerning aerial photography and its use as a means to study coastal shoreline problems such as erosion and pollution, and to survey coastal and land areas. (This updated bibliography contains 98 citations, 16 of which are new entries to the previous edition.)

15. MILITARY SCIENCES

15C. Defense

AD-A119 414/1 PC **A25**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
The Politics of Weapons Standardization in NATO.
Doctoral thesis,
Richard Charles Fast. Jul 81, 588p Rept no. AFIT/CI/NR-81-52D

Awareness of the growing conventional imbalance between the Warsaw Pact and NATO led, in the early 1970s, to a search for ways for NATO to regain the lead or at least to balance the Warsaw Pact. Since it offered an appealing logic, standardization of weapon systems within NATO was rapidly embraced as a major means of redressing the balance. Standardization promised increased military effectiveness without increased costs (and, some argued, at lower costs) through reduction of waste caused by duplication of systems. Standardization was embraced in spite of a 25-year history of failures of similar efforts within NATO. The hypothesis of this dissertation is that this new effort will, likewise, fail to achieve any significant degree of standardization. Proponents of standardization fail to appreciate that weapons procurements are a low policy (domestic) issue and that weapons procurement decisions have traditionally been made in a disaggregated fashion (by subgovernments). Standardization requires a high policy (strategic) focus in which domestic concerns are secondary. (Author)

AD-A119 573/4 PC **A04**/MF **A01**
Human Sciences Research, Inc., Mclean, VA.
Crisis-Expectant Planning for Crisis Relocation.
Final summary rept. Apr 78-Oct 81,
William W. Chenault. Oct 81, 54p Rept no. HSR-RR-82/1-Me-X
Contract DCPA01-78-C-0193

The report summarizes the development of 'crisis expectant,' emergency management planning for the crisis relocation of the American population during international crises. Crisis-expectant planning is examined in relation to this contract's previously reported work; in implications of greater population dispersal for Reception/Care planning; refinements in the Organizational Relocation concept originated by the author; the analysis of crash evacuation planning efforts at Three Mile Island, and several Emergency Management Institute Symposia which disseminated information about Reception/Care, Organizational-Relocation, and crisis-expectant planning concepts. Emergency Management implications of crisis-expectant planning are outlined. (Author)

AD-A119 687/2 PC **A03**/MF **A01**
Air War Coll., Maxwell AFB, AL.
Sub-Saharan Africa's Changing Military Environment.
Study rept.
Jun 82, 44p

The conventional wisdom about the African military is becoming out dated. African armies have reached a watershed in their transision from the internal security-oriented forces of their colonial origins, to becoming national armed forces with serious defense responsibilities. Available data indicate that African forces are growing in size, sophistication and combat capability that is important in the African context. Their capacity for waging war is improving and this will have a significant impact on the frequency, scope and character of African wars of the future. African armies are becoming more externally oriented and regional military powers are developing. All of these trends are changing Africa's military environment. (Author)

AD-A119 701/1 PC **A12**/MF **A01**
IIT Research Inst., Chicago, IL.
Damage Functions for Upgraded Shelters.
Final rept. 15 Sep 80-20 Aug 81,
A. Longinow, M-Y. Wu, and J. Mohammadi. Aug 82, 251p Rept no. IITRI-J6528
Contract EMW-C-0374

The probability of survival is predicted of people located in conventional, expediently upgraded basements when subjected to the blast effects produced by the detonation of a 1-MT weapon near the ground surface. Two categories of potential shelters are considered here, i.e., engineered buildings and single-family residences. The first category included 12 basements designed for live loads in the range from 50 psf to 250 psf and slab spans from 12 ft to 20 ft. Each of these was analyzed as expediently upgraded using four different upgrading schemes. An expedient upgrading scheme involves strengthening the slab over the basement by providing intermediate supports and blocking off all openings into the basement. This resulted in 60 shelters of different strengths which include the conventional, unupgraded slabs as base cases. The second category included four conventional single-family dwellings with full basements. Each was evaluated when upgraded using a studwall upgrading concept. Two of the basements were reevaluated using the post and beam upgrading concept. These upgrading concepts are essentially similar and were used as intermediate supports for strengthening the joist floor systems. A probability of survival function was developed for each shelter and each upgrading scheme. The report includes a description of the shelters analyzed, a description of the method used in performing the analysis, detailed results, conclusions and recommendations.

15E. Logistics

AD-A119 428/1 PC **A03**/MF **A01**
Army Inventory Research Office, Philadelphia, PA.
Comparison of RIMSTOP (Retail Inventory Management Stockage Policy) to Current Retail Inventory Policies.
Final rept.,
Arthur Hutchison. Nov 81, 32p Rept no. USAIR-261

A comparison by simulation is made between the RIMSTOP (Retail Inventory Management Stockage Policy) to current Army stockage procedures. Results indicate RIMSTOP expended fewer dollars than the current procedures to obtain the same customer satisfaction level. Also, stockage turbulence can be significantly reduced by extending the demand base used in depth and breadth decisions to two years. Currently a one year base is used. (Author)

AD-A119 437/2 PC **A10**/MF **A01**
Readiness Group Bragg, Fort Bragg, NC.
Commander's Workbook for Administration and Logistics.
2nd edition.
1 Aug 82, 223p

The Commander's Workbook for Administration and Logistics was created to assist Reserve Component (RC) unit commanders in the supervisory areas of administration and logistics. The procedures established herein are intended to provide commanders with a working knowledge of certain functional responsibilities of Administrative Supply Technicians (AST's) and Full Time Manning (FTM) personnel. This workbook is applicable to all commanders of RC company and detachment size units. The workbook is divided into five (5) groups. Each group addresses a major functional administrative/logistical area; Group 1, Personnel; Group 2, Administration; Group 3, Unit Supply; Group 4, Food Service; and Group 5, Strength Maintenance. Each group is subdivided into specific functional responsibilities referred to as modules.

AD-A119 483/6 PC **A04**/MF **A01**
Logistics Studies Office (ALMC), Fort Lee, VA.
Warranty Decision Process.
Final rept.,
John R. Lenassi. Feb 82, 60p Rept no. LSO-037

This study has two objectives. It seeks first to determine how the newly published Army warranty program regulation, AR 702-13, has been received and implemented within the Army. Secondly, the study seeks to develop a decision methodology for use by those who acquire warranties. The report reveals that although the regulation was neither well known nor much used, attempts to manage warranties were discovered. Some acquiring commands within DARCOM have established systems to manage warranties, but they are not effective. Many installations have also established warranty management systems, and some of them are effective. The motivation for these warranty management systems appears to be DA initiatives other than the AR. The report recommends wider distribution of AR 702-13, some actions to establish and standardize the management of warranties within the Army, and offers a warranty acquisition methodology for approval. (Author)

AD-A119 484/4 PC **A03**/MF **A01**
Logistics Studies Office (ALMC), Fort Lee, VA.
Transition of Equipment from the Active Army to the Reserve Forces.
Final rept.,
John N. Jaeger. Nov 81, 44p Rept no. LSO-027

This report examines how and why the introduction of displaced equipment from the Active Army into the Reserve components has an adverse impact on combat readiness. The conclusions are that the United States Army has no standardized methodology for the introduction of equipment into the Reserve Forces, that the overall problem is systemic in nature, and that, while DARCOM cannot solve the systemic problem, actions can be taken to reduce the effects of the problem at the Reserve Component unit level. The report recommends that all major items of equipment transferred to the Reserves be treated as new equipment that life cycle costs be re-examined be introduced in conjunction with a Mission Support Plan, Materiel Fielding Plan, and New Equipment Training. (Author)

AD-A119 501/5 PC **A03**/MF **A01**
Naval Facilities Engineering Command, Alexandria, VA.
Cargo Handling Facilities. Design Manual 25.3.
Final rept.
Jul 81, 30p Rept no. NAVFAC-DM-25.3

Basic criteria for cargo handling is presented for use by experienced engineers. The contents cover considerations for the handling of cargo between vessel and dock, vessel and shore, and the handling of cargo in pier sheds. (Author)

AD-A119 502/3 PC **A03**/MF **A01**
Naval Facilities Engineering Command, Alexandria, VA.
Maintenance Facilities for Ammunition, Explosives, and Toxics. Design Manual 28.3.
Final rept.
Nov 81, 32p Rept no. NAVFAC-DM-28.3

Basic design suidance for maintenance facilities for ammunition, explosives and toxics covered by Category Group 216 is presented for use by experienced architects and engineers. The contents include design data for buildings and shop areas to provide facilities for repairing and maintaining ammunition, rockets, bombs, mines, grenades, torpedoes, depth charges, air/underwater weapons, demolition materials, pyrotechnics, guided missile fuels, ammunition parts, and related chemicals. (Author)

AD-A119 503/1 PC **A02**/MF **A01**
Naval Facilities Engineering Command, Alexandria, VA.
Shipyard Maintenance Facilities. Design Manual 28.2.
Final rept.
Nov 81, 18p Rept no. NAVFAC-DM-28.2

Basic guidance is presented for the design of shipyard maintenance facilities covered by Category Group 213. The contents include general design criteria and instruction for obtaining specific criteria for the shop structure to be designed. (Author)

AD-A119 512/2 PC **A07**/MF **A01**
Naval Facilities Engineering Command, Alexandria, VA.

Drydocking Facilities Characteristics. Design Manual 29.3.
Final rept.
Nov 81, 140p Rept no. NAVFAC-DM-29.3

Navy drydocking facilities include graving drydocks, marine railways and marine lifts. Presented are the principal dimensions and characteristics of these drydocking facilities and plans indicating their locations in naval shipyards or other naval shore installations. (Author)

AD-A119 514/8 PC **A05**/MF **A01**
Naval Facilities Engineering Command, Alexandria, VA.
Structural Engineering. Loads. Design Manual 2.2.
Final design criteria.
Nov 81, 84p Rept no. NAVFAC-DM-2.2
Supersedes Chapter 1 and Changes 1, 2, 3, and 4 of Rept. no. NAVFAC-DM-2 dated Oct 70.

Criteria for the estimation of loadings to be used in the design of civil engineering structures are presented for use by experienced engineers. Criteria relating to combining loads for purposes of design and suggested limitations on deflections also are presented. (Author)

AD-A119 515/5 PC **A06**/MF **A01**
Naval Facilities Engineering Command, Alexandria, VA.
Tropical Engineering. Design Manual-11.1.
Final design criteria.
Mar 80, 115p Rept no. NAVFAC-DM-11.1

Guidance and policy are presented for the design, construction, and maintenance of shore facilities in the tropics utilizing qualified materials, applications, and methods to overcome the aggressive solar radiation, high humidity, salt spray, mildew, and termites. The design and materials include concrete, masonry, wood and wood products, steel and other metals, paints and protective coatings, windows, doors, roofing, ceilings, and mechanical and electrical items. (Author)

AD-A119 516/3 PC **A03**/MF **A01**
Naval Facilities Engineering Command, Alexandria, VA.
Unaccompanied Personnel Housing. Design Manual 36.1.
Final design criteria.
Aug 81, 35p Rept no. NAVFAC-DM-36.1
Supersedes NAVFAC-DM-36 dated Feb 68 and Change 1 dated May 68.

Design criteria for Unaccompanied Personnel Housing are presented for use by experienced architects, interior designers and engineers. This manual provides general design guidance for Unaccompanied Enlisted Quarters, Unaccompanied Officer Quarters, and Enlisted Personnel Dining Facilities for Navy and Marine Corps personnel. Modernization programs for existing facilities are also covered. (Author)

AD-A119 532/0 PC **A02**/MF **A01**
Naval Facilities Engineering Command, Alexandria, VA.
Administrative Facilities.
Final rept.
Mar 81, 19p Rept no. NAVFAC-DM-34

Design criteria for use by experienced architects and engineers are presented for facilities covered by category class 600. The contents include criteria for Navy and Marine Corps administration buildings and related facilities. This includes architectural, mechanical and electrical requirements, areas housing vital electronic equipment, and requirements for security and restricted areas, plus designs and types of flagstaffs. (Author)

AD-A119 533/8 PC **A02**/MF **A01**
Naval Facilities Engineering Command, Alexandria, VA.
Unaccompanied Enlisted Quarters.
Final rept.
Aug 81, 22p Rept no. NAVFAC-DM-36.2

Design criteria for Unaccompanied Enlisted Quarters are presented for use by experienced planners, architects, interior designers, and engineers. The contents contain basic program information for Navy and Marine Corps Unaccompanied Enlisted Quarters, including both new and modernization projects. (Author)

AD-A119 558/5 PC **A03**/MF **A01**
Logistics Management Inst., Washington, DC.
Automation - A Tool for Procurement,
Robert S. Young, and David L. Goodwin. Jul 82, 35p
Rept no. LMI-RE201
Contract MDA903-81-C-0166

As DoD's procurement workload has continued to grow faster than its workforce, most major DoD purchasing activities have successfully introduced automation into their procurement processes. This report identifies the steps in the procurement process that have been automated, and the automated systems that exist today. Also noted are major gaps, where automation is appropriate, but used only slightly. The reasons for some systems being less successful than others are discussed, and recommendations are included to improve the climate for the development of future systems in DoD. (Author)

AD-A119 689/8 PC **A02**/MF **A01**
Army Armament Research and Development Command, Watervliet, NY. Large Caliber Weapon Systems Lab.
Group Technology of Weapons Systems.
Final technical rept.
1 Sep 82, 8p

In all manufacturing systems, one of the major problems encountered is the proliferation of designs and parts. The Army is no exception to this manufacturing ailment. Technologies are now being introduced in industry and in some government installations which classify designs and parts so they may be grouped into so-called families. Benet Weapons Laboratory has been actively engaged in the field of Group Technology since 1971. The purpose and structure of the Manufacturing Methods and Technology (MMT) Project titled, End Item Manufacturing Guide had a definite group technology approach. In that project, a method of viewing machining processes in a technology-independent manner utilizing what we termed a functional analysis structure or classification scheme was developed. Meanwhile, a more formalized procedure was being developed and used by manufacturers. The major thrust of these developments was to seek out similarities among parts and among methods for producing those parts, and then using similarities to increase the size of the batches for production purposes. In other words, the purpose was to bring mass production economics to batch or small lot manufacturing.

AD-A119 692/2 PC **A05**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
Maritime Logistical Support - Can We Sustain Our Armed Forces during War,
Study project,
Ora Franklin Fraze, and Arthur Eugene Henn. 8 Jun 82, 83p

The basic question is whether or not sufficient merchant ship and crews are available to sustain our forces during war. Both the civilian and military leadership of this nation are focusing more attention on this question. Although as a nation, we generally recognize that the numbers of the US merchant ships and seamen are declining, we don't seem to understand the consequences. This study looks at the consequences of the United States having to sustain our armed forces in a credible wartime scenario. Background information, insights and data were gathered from a literature search, visits, and personal interviews with maritime officials. The individual programs of various agencies and organizations intended to provide this nation with an effective merchant marine are laudable. However, it is disconcerting to observe the failure of this nation to set forth a national maritime policy that provides a capstone for all the individual programs. It is concluded that we do not have sufficient numbers of several ship-types to sustain our armed forces in a war. Although sufficient seamen are available today, this will not be the case at the end of this decade.

AD-A119 770/6 PC **A09**/MF **A01**
BDM Corp., Vienna, VA.
Effectiveness of Mission Essential Maintenance Only (MEMO) during Transition to War.
Final study rept. Jun 81-Jun 82.
16 Jun 82, 200p Rept no. BDM/W-82-313-TR
Contract MDA903-81-C-0411

Study focused on heavy present and 1986 era equipment to define impact of contingency maintenance standard on policies, procedures, doctrine in AR 750-1; determine impacts of transitioning to new standards, and impacts on turn around times/special controls. Central objective was to assess MEMO as one means of providing essential maintenance with a reduced strength maintenance force during the transition to war period. (Author)

15F. Nuclear Warfare

DE82012696 PC **A05**/MF **A01**
Lawrence Livermore National Lab., CA.
Dynamic Model for the LLNL Shock-Hardened Data Recorder.
G. A. Clark, and W. J. King. Mar 82, 95p UCID-19196
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche only after original copies are exhausted.

This report describes the analysis, simulation, and validation of a dynamic model for the LLNL shock-hardened recorder designed to record accelerations experienced by a warhead during collision with various targets, projectiles, and media. The importance of modeling and signal processing to the recording and smart fuzing problems, models for the various recorder components, and the computer code used to simulate the models are discussed. The model validation work is discussed and the results presented, showing that the model closely predicts the recorder's behavior. Some proposed work involving modeling accelerometers, a warhead, and a shock test fixture are also briefly described. (ERA citation 07:044616)

DE82013397 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Dynamic Shear Behavior of Alumina-Filled Epoxy.
L. S. Costin. Mar 82, 22p SAND-82-0344
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

Thin-walled tubular specimens of alumina-filled epoxy were loaded in torsion at a strain rate of approximately 10 exp 3 s exp -1 using a stored-torque Kolsky bar. In addition to measuring the time resolved shear stress and shear strain in the specimen, the axial stress generated by the dilation of the material during shear deformation was also obtained as a function of time. Tests were conducted at room temperature and at -60 exp 0 C. At room temperature, a moderate amount of plastic deformation occurred before failure. Material dilation was associated with the plastic flow. At -60 exp 0 C, there was a marked increase in failure stress over the failure stress at room temperature. However, little or no plastic deformation or dilation occurred before failure. (ERA citation 07:044614)

15G. Operations, Strategy, and Tactics

AD-A119 624/5 PC **A09**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Deterministic Aggregated Model of STAR on the Apple Computer (DAMSTAC).
Master's thesis,
Charles J. McKenzie, III , and Thomas Joseph Pawlowski, III . Mar 82, 179p

This thesis investigates the estimation of Lanchester attrition-rate coefficients in a deterministic aggregated combat model. Numerical values for the attrition-rate coefficients in the Lanchester-type model are taken to be the same as those for a corresponding continuous-time Markov-chain model and maximum likelihood estimators are developed for these Markov-chain coefficients. A discussion of the historical background of Lanchester's equations preceeds the theoretical development of components of the attrition rate equations. Using the functional forms and procedures developed by Gordon M. Clark in his doctoral thesis, a simple computer simulation program is developed for a short duration battle consisting of homogeneous forces. Recommendations are made to modify this program to model heterogeneous forces in a similar battle. A discussion of the theoretical background supports these recommendations. (Author)

AD-A119 691/4 PC **A03**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
Interoperability-Reforger 80 Illustrates the Importance.
Student essay,
Jerry R. Rutherford. 16 Apr 82, 37p

This essay capitalizes on the experiences of the 2d Armored Division (US) during REFORGER 80. Using both a preceeding CPX and the subsequent FTX, the author describes the experiences of the 2d AD while it was subordinate to the British 1st Corps in NORTHAG to describe the international coordination problems in the areas of liaison exchanges, passage of lines and command, control and communications. The essay describes the preparations and the actual activity. Using the description as a basis, he then focuses on these areas essential to the successful conduct of the activity. Much of the success was achieved as a result of efforts beyond what is called for in normal US doctrines and organizations. (Author)

AD-A119 694/8 PC **A06**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
TAC Air Support of the US Army High Technology Force.
Study project,
Ralph T. Browning. 12 May 82, 115p

The US Army's new programs of High Technology Test Bed (HTTB) and High Technology Light Division (HTC), are heavily reliant on the availability and responsiveness of tactical airpower throughout the range of battle field tasks. Although these demands fall within the context of traditional airpower missions, the amount of TAC air and degree to which HTTB and HTLD seek to exercise control over air assets is unprecedented. This concept forces resolution of longstanding doctrinal issues between the Air Force and Army. The Air Force and Army should continue to actively pursue answers to these issues to the end of making HTLD and TAC air forces a more effective fighting team. (Author)

AD-A119 702/9 PC **A03**/MF **A01**
Naval War Coll., Newport, RI.
The Military in the Post-Vietnam ERA: A Search for Relevance,
Lawrence B. Wilkerson. 10 May 82, 28p

From April 1917 to September 1945, the American military establishment evolved into a contradiction in the American polity. After August 1945 the contradiction had become an aberration as well. It was an aberration because it possessed (though it did not know quite what to do with) a destructive apparatus that threatened the planned extinction of mankind, and it was a contradiction because it endeavored to perpetate and indeed to secure the gap between American ideals and American political practice which it as an institution had come to represent. Ironically, it simultaneously became the instrument of force of the sole nation on earth capable of guaranteeing--with any degree of certitude--the protection and continuation of human freedom and dignity as both a creed and a way of life. How this difficult and paradoxical circumstance can be defined, analyzed, dealt with and accommodated within the American military establishment itself, is the subject of this brief work. (Author)

AD-A119 811/8 PC **A03**/MF **A01**
Army War Coll. Strategic Studies Inst., Carlisle Barracks, PA.
Transatlantic Clausewitz.
Occasional paper,
John E. Tashjean. 10 Aug 82, 29p

Clausewitz, like Hegel, fell victim to the Polish cholera of 1831. Yet he remained alive intellectually; his presence, at first peripheral and distorted, gradually grew more significant and universal. The Prussian victories of the nineteenth century, like the German disasters of the twentieth, stimulated interest in him. Leftists of different countries and different hues, including Koerner, Lenin and Mao, took him seriously. In the fifties, the problematic relation of nuclear weapons to rational statecraft made him a controversial symbol and the object of Professor Aron's protracted study now nearing appearance in two volumes in English. In 1966 Professor Hahlweg edited in masterly fashion the first of two volumes of Clausewitz papers, containing primarily lectures on guerilla warfare given at the Kriegsakademie in 1810 and 1811. The second volume, expected in 1982, contains early philosophical texts. The 1980 bicentennial of the birth of Clausewitz occasioned various editions, symposia and commentary new and reprinted. America's Korean and Vietnamese wars have made him a major reference point in continuing controversies and postmortems about strategy.

16. MISSILE TECHNOLOGY

16A. Missile Launching and Ground Support

PB83-851907 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Guided Missile Silos. 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Oct 82.
Oct 82, 195p

This bibliography contains citations concerning guided missile silo technology. Engineering geology, environmental impact analysis, guided missile launching hazards and mishaps, silo venting, and seismic wave impact are among the topics discussed. Subterranean design and testing simulations for structurally sound guided missile silo construction are included. (Contains 148 citations fully indexed and including a title list.)

16D. Missiles

AD-A119 759/9 MF **A01**
National Defense Univ., Washington, DC. Research Directorate.
Accelerated Production: The Air-to-Air Missile Case,
John C. McLaurin. 1981, 79p Rept no. NATL SEC AFFAIRS MONO SERIES-81-3
Availability: Superintendent of Documents, GPO, Washington, DC 20402 PC $4.50 (Microfiche furnished to DTIC (and NTIS) users.

Currently, the US stockpile of air-to-air missiles falls short of requirements and the industrial base is not capable of closing the gap in a timely manner. Moreover, constraints on the defense budget are not likely to loosen. In view of these realities, schemes calling for total investment in a less-than-adequate stockpile speculate on single scenarios, thereby jeopardizing national security. We should invest in both a larger stockpile and increased industrial capability. The Industrial Preparedeness Program has failed to increase industrial capability for both peacetime and wartime production because it has not been well understood, supported, or executed. Key government personnel have given the program low priority, and industry, sensing that attitude, has lost faith in the program. Industry's lessened commitment, in turn, has precipitated further reduction in Government support. To invigorate the program and, more importantly, industrial preparedness, Government needs to tie investments in surge and mobilization capability to peacetime production contracts.

17. NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17A. Acoustic Detection

PAT-APPL-6-377 214 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Missile Impact Location System, Method, and Apparatus.
Patent Application,
Richard Lane. Filed 11 May 82, 23p AD-D009 699/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The patent application relates to an improved sonobuoy having the ability to receive and transmit Global Positioning System data from satellites and is used in an array of GPS, active, and passive sonobuoys to locate the impact of reentry vehicles. GPS data and acoustic signature data is transmitted to a nearby aircraft for data processing and storage. Pingers on the GPS sonobuoys allow other sonobuoys' positions to be determined with high accuracy. This system allows for accurate determination of RV impact points. (Author)

17B. Communication

AD-A119 423/2 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
Multi-Access in Packet Radio Networks.
Master's thesis,
Erdal Arikan. Sep 82, 75p Rept no. LIDS-TH-1234
Contract N00014-75-C-1183

A PRN (packet radio network) is a collection of geographically distributed, possibly mobile users where each user is capable of transmitting and receiving messages over a shared broadcast medium. In a PRN, messages are divided into packets, which may be fixed or variable in length, and each packet is transmitted through the network individually. Packets are assembled at their destinations to reconstruct the original messages. The data traffic in a PRN is characterized by specifying the average message arrival rates to the network for each o-d (origin-destination) pair. A set of o-d rates is called feasible if there exist network protocols under which the number of packets in the network still not delivered to their destinations remains finite with probability one. The capacity region of a PRN is defined to be the set of all feasible sets of o-d rates. In this thesis, PRNs are studied from the viewpoint of feasibility, i.e., we take an arbitrary set of message input rates as given and try to determine if it is feasible. Our main conclusion is that, unless P = NP, there exists no practical algorithm for characterizing the capacity region of a PRN, in the sense that the decision problem regarding the feasibility of a given set of o-d rates in NP-complete. (Author)

AD-A119 427/3 PC **A02**/MF **A01**
Army Avionics Research and Development Activity, Fort Monmouth, NJ.

Electronic Voice Communications Improvements for Army Aircraft.
Research and development technical rept.,
Mitchell S. Mayer. Aug 82, 21p USAAVRADCOM-TR-81-E-1

The communications systems on all Army aircraft flying today are based on design concepts that are over 50-years old. We have designed a totally modern, state-of-the-art communications system for Army aircraft, and have published two new specifications which contain many of the modern test procedures required to accurately test and evaluate the various components of the communication system. As a first step in the development of new test procedures, we evaluated both ASA and ANSI standards and found them lacking. The components of the new state-of-the-art communications system will include, as a minimum: high impedance DC powered noise canceling microphones (using piezoelectric ceramic, electret, or PVF2 diaphragms); earphone elements designed and tested to have flat frequency response when inside the circumaural earcup of the hearing protective device; and intercoms which replace positive peak-clipping with fast-acting AGC circuits and expander/compander circuits for maximum output signal without distortion, even under conditions of extremes stress. In the future, audio signals in the microphone will be converted into the digital mode or directly into the optical spectrum for high efficiency, and secure communications inside the aircraft. The savings in weight and security improvements will be considerable.

AD-A119 529/6 PC **A24**/MF **A01**
Boeing Military Airplane Co., Seattle, WA.
MIL-STD-1553 Multiplex Applications Handbook.
Final technical rept.,
Al Crossgrove, Mack McCall, Lee Smith, Ray Turner, and Don Ellis. 1 May 80, 558p
Contract F33615-78-C-0112

Contents: System Design; Hardware Design; Software Design; Multiplex System Examples; Review and Rationale of MIL-STD-1553A and MIL-STD-1553B; Terms and Definitions; Bibliography; Parameter Formats, and Index.

AD-A119 628/6 PC **A09**/MF **A01**
Washington Univ., St. Louis, MO. Center for Computer Systems Design.
VLSI Based Multiprocessor Communications Networks.
Annual progress rept. 1 Sep 81-31 Aug 82,
Mark A. Franklin, and Donald F. Wann. Sep 82, 187p
Contract N00014-80-C-0761

An analysis of two system control methodologies, synchronous (i.e. based on the presence of a central clock) and asynchronous (i.e. self-timed, no clock is present) is presented in the context of interconnection networks (and one dimensional systolic array design). The interconnection networks of interest are oriented towards use in a multiprocessor environment. Other issues related to network design, such as pin limitations and partitioning, are considered, and an improved type of Delta network, the reinforced Delta network is defined and its properties studied. (Author)

AD-A119 679/9 PC **A04**/MF **A01**
Federal Aviation Administration Technical Center, Atlantic City, NJ.
Flight Plan Filing by Speech Recognition.
Final rept.,
Ephraim Shochet, Louis Delemarre, and Paul Quick. Jul 82, 69p DOT/FAA/CT-81/64, DOT/FAA/RD-82/39

The purpose of this effort was to develop and demonstrate the capability of automatic flight plan filing by machine recognition. In 1979, the Technical Center undertook an extensive effort to upgrade the Utterance Recognition Device (URD) in preparation for testing the capabilities of voice input for automatic flight plan filing. The URD was modified to include more reliable components, where advisable, and a larger memory to handle the expanded vocabulary. In addition, a dialect study was conducted to determine the locations for collecting a nationally representative voice sample in order to create reference patterns capable of performing well on all American dialects. Subsequently, over 5,000 voices from 24 cities throughout the United States were collected and processed.

AD-A119 776/3 PC **A05**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
Combined Quarterly Technical Report Number 26. SATNET Development and Operation, Pluribus Satellite IMP Development, Remote Site Maintenance, Internet Operations and Maintenance, Mobile Access Terminal Network, TCP for the HP3000, TCP for VAX-UNIX.
Quarterly technical rept. 1 May-31 Jul 82,
J. F. Haverty. Aug 82, 80p Rept no. BBN-5129
Contracts MDA903-80-C-0353, N00039-82-C-0412
Sponsored in part by Contracts N00039-80-C-0664, N00039-81-C-0408 and MDA903-80-C-0214.

This Quarterly Technical Report describes work on the development of and experimentation with packet broadcast by satellite; on development of Pluribus Satellite IMPs (Interface Message Provision); on a study of the technology of Remote Site Maintenance; on Internetwork monitoring; on shipboard satellite communications; and on the development of Transmission control Protocols for the HP3000 and VAX-UNIX. (Author)

AD-A119 792/0 PC **A04**/MF **A01**
Federal Aviation Administration, Washington, DC. Systems Research and Development Service.
Frequency Management Engineering Principles--Spectrum Measurements (Reference Order 6050.23).
Final rept.,
Joseph D. Fretz. Aug 82, 73p Rept no. DOT/FAA/RD-81/81

Federal Aviation Administration personnel are frequently involved in the resolution of interference complaints. The skillful use of measurement equipment can be essential to the successful resolution of such complaints. This report provides a summary of the spectrum measurement techniques applicable to Federal Aviation Administration facilities using the radio frequency spectrum. It is oriented toward electromagnetic compatibility measurements made by frequency management engineers but is of interest to anyone involved in radio frequency measurements. (Author)

DE82015885 PC **A07**/MF **A01**
Los Alamos National Lab., NM.
Computing Division Two-Year Operational Plan, FY 1982-1983.
R. H. Ewald, and B. L. Buzbee. Jan 82, 137p LA-9335-MS
Contract W-7405-ENG-36
Portions of document are illegible.
Microfiche only after original copies are exhausted.

This plan provides users of the Los Alamos Integrated Computing Network with the Computing Division's (C Division) software and hardware plans for fiscal years 1982 and 1983. We want users to know what we are working on, what it looks like, and when it will be ready. Our implementation of this plan is equally simple on the surface; that is, we will do what is outlined in this plan as promised. Our list of FY 1981 accomplishments is evidence of our belief in this planning and implementation process and of our commitment to provide our users with the best possible computing facilities.

N82-31587/0 PC **A03**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Configuration of a Low Capacity Scpc FM Ground Station for 6/4 Ghz Configuracao de Uma Estacao Terrena Scpc FM de Baixa Capacidade Para 6/4 Ghz.
H. Aranha. Mar 82, 36p INPE-2350-NTE/182
Text in Portugese.

The mechanical configuration of the frames (drawers) for the receiver, transmitter, input and power divider, channel units, and ventilation modules which compose the racks for the SCPC ground station is described. The installation of the frames into the rack is described. The front and back panels of the frames and the coaxial cables and interconnections between the frames are also described.

N82-31588/8 PC **A03**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Spine: Communications Earth Station Operating Procedures.
K. Green. Mar 82, 37p RAE-TM-SPACE-300, BR83034

Operating procedures for a satellite ground station, consisting of data terminal, channel synchronizer, computer interface module and SEL 32/77 link driving computer are presented. Switch on, interconnection cables, parameter setting, link driving computer operating system, communications software operation, and ground station shutdown are covered.

N82-31599/5 PC **A02**/MF **A01**
Little (Arthur D.), Inc., Paris (France).
Fiber Optics Networks or Communication Satellites: Alternatives,
M. H. Ross. 1981, 17p
Sponsored by Esa.

Trends in communication technology are surveyed, and the roles of fiber optics and satellite based systems are predicted. Economic factors are seen as predominant in the choice of system. Fiber optics, in the short term, are becoming cost competitive with coaxial cables and microwave techniques over short distances and high channel densities. This trend is expected to continue, with fiber optics becoming a dominant. The relative maturity of space system technology makes large cost reductions through technological breakthroughs unlikely, so satellites remain economically viable only for very long distance links. The projected fiber optic transatlantic cable may be cost competitive with Intelsat satellites. The main advantage of satellite systems is their capacity to test services before they are implemented in terrestrial networks.

N82-31602/7 PC **A05**/MF **A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
Study on Synopsis of Satellite Scatterometers for Ca Band and K Band.
Final Report.
W. Gilg, W. Gieraths, P. Hans, and H. Schuessler.
Dec 81, 100p ESA-CR(P)-1582
Contract ESA-4772/81/F-DD(SC)

The performance of the ERS-1 wind scatterometer if antenna length is reduced from 4.8m to 3.6m, and differences in hardware design, performance, and cost when using a C band or a K band scatterometer were studied. The scatterometer section of the active microwave instrument (AMI) was designed for operation in the K band with antenna lengths up to 3.6m. A change to K band requires two additional K band high power amplifiers. An additional 125W may be needed to keep these amplifiers within temperature limits during eclipse. The only advantage of K band scatterometry is that a proven reference model for radar sea return already exists. Cost and sensitivity to atmospheric disturbances weigh against a C/K hybrid. Mass and power requirements favor a fully integrated C band AMI.

N82-31605/0 PC **A03**
Fondazione Ugo Bordoni, Rome (Italy).
Optimal Coexistence in the Same Frequency Band of Television and Mobile Radio Services Coesistenza Ottimale Nella Stessa Banda di Frequenza di Servizi Radiomobili E Televisi.
S. Bonora, G. Falciasecca, and M. Frullone. Dec 81, 47p FUB-36-198
Text in Italian.

Mutual interference between the 174 to 230 MHz television band transmission and mobile communication transmissions by the SST technique is reviewed. Theoretical aspects of SST electronic subsystem development are considered. An emphasis weighting function technique applied to a frequency hopping SST system is analyzed and compared to the operation of frequency hopping in regions of the television frequency band which are less sensitive to interference. The characteristics of measuring systems adapted to the research needs of SST development are discussed.

N82-31606/8 PC **A03**
Fondazione Ugo Bordoni, Rome (Italy).
A New Algorithm for the Automatic Segmentation of the Voice Signal in Sound and Soundless Tracks UN Nuovo Algoritmo Per la Segmentazione Automatica Del Segnale Vocale in Tratti Sonori E Non Sonori.
S. Scotti, and D. Deseta. Dec 81, 31p FUB-39-1981
Text in Italian.

A decision algorithm sound-no sound to be employed in voice signal analysis is presented. The parameters involved are the first coefficient of linear prediction, the energy of the voice signal segment and the energy of the prediction error. The experimental results show a

three modes distribution indicating that the algorithm also discriminates the pauses from the no sound tracts. The time function of the sound track recognition probability is presented in two examples reffered to the same phrase uttered by six speakers, analyzed at 25.6 msec intervals.

N82-31607/6 PC **A03**
Fondazione Ugo Bordoni, Rome (Italy).
Cost 201 Stand-by Network Optimization Module (Sbo). Part 2: Evaluation of Primal and Dual Procedures.
U. Mocci, and G. Ravaioli. Dec 81, 28p FUB-40-1981

Primal and dual optimization procedures are described and compared. In both procedures capacities are increased step by step so as to reduce the total unfeasibility of the stand by network. In Primal, a minimum cost routing is found for each requirement and the edge capacities are accordingly adjusted where needed. In dual, all not yet feasible requirements are routed on the current network, suitable indexes to measure the effectiveness of new additions are computed and additional capacity is provided on the edges having the best figures of merit. Computer simulation tests show that both procedures are basically equivalent, although primal procedures, being faster, are more attractive for use in the Cost 201 project.

N82-31608/4 PC **A02**/MF **A01**
Fondazione Ugo Bordoni, Rome (Italy).
A Computing Method of the Error Probability in 4PSK Transmitting Systems under Selective Fading Condition Metodo di Calcolo Della Probabilita di Errore Nei Sistemi di Trasmissione 4PSK Affetti DA Fading Selettivo.
F. Andreucci, and P. G. Marchetti. Dec 81, 14p FUB-43-1981
Text in Italian.

A method for computing the error probability in 4PSK systems which is easier to implement and shorter to compute than the Gram-Charlier series expansion previously proposed, is described. The method is applicable when the interference amplitude after each pulse vanishes in a time interval shorter than 10 pulse to pulse periods. Models for the complex demodulated signal and for the transfer function of the multipath transmission are presented. A step by step calculation procedure is described and the implementation of the algorithm is discussed. An application example shows that the probability is computed with a 2% precision in one tenth of the time required for the Gram-Chartier series to start convergence.

N82-31610/0 PC **A03**/MF **A01**
Fondazione Ugo Bordoni, Rome (Italy).
Analysis of Synchronizers with Delay in the Presence of Multiple Path Analisi Dei Sincronizzatore Con Ritardo in Presenza di Cammini Multipli.
F. Andreucci, and P. G. Marchetti. Dec 81, 42p FUB-47-1981
Text in Italian.

A synchronizer composed of a delay line, summing, selective filter, forming network and zero crossing was studied. The feed signal was of a 4PSK type at a relatively low frequency. The two binary sequences were obtained by pseudorandom generators. Thermal noise was simulated by FORTRAN subroutine. It is shown that for signal to noise (SNR) larger than 10dB the average zero crossing is practically independent of the SNR, but the standard deviation increases considerably at the lower values of the SNR. The presence of the synchronizer improves the receiver performance substantially.

N82-31611/8 PC **A03**/MF **A01**
Fondazione Ugo Bordoni, Rome (Italy).
Report on the Collaboration Activities Between Fondazione Ugo Bordoni and the Instituto Superiore Poste E Telecomunicazioni Relazione Sull'Attivita di Collaborazione Con l'Istituto Superiore Poste E Telecomunicazioni Svolta Dalla Fondazione Ugo Bordoni Nel 1981.
Annual Report, 1981.
R. Koch. Feb 82, 46p
Text in Italian.

Research concerning radio communication systems, cable communication systems and digital systems, automatic communication, management and control systems, and laser and optoelectronic systems is summarized.

N82-31612/6 PC **A02**/MF **A01**
Fondazione Ugo Bordoni, Rome (Italy).
Pairs of Arc-Disjoint Paths in a Network.
P. Filipponi, and F. Mazzarella. Jan 82, 20p FUB-1-1982

Two methods for finding suboptimal arc-disjoint paths between two given nodes of a network are discussed and compared to an existing optimal (minimum cost) method. Computation time for both methods are shorter than the optimal method and a computer experiment shows that for one of the methods the probability of cost coincidence with the optimal method is close to one for a sufficiently large number of the network nodes. The problems of finding the optimal pair of arc-disjoint paths with a unique source (or destination) is also discussed.

N82-31613/4 PC **A02**/MF **A01**
Fondazione Ugo Bordoni, Rome (Italy).
Measuring Methods of the Intelligibility and the Intelligibility Limit of Voice Signals Metodi di Misura Della Intelligibilita E Della Soglia di Intelleggibilita Del Segnale Vocale.
S. Scotti. Jan 82, 24p FUB-5-1982
Text in Italian.

The definitions of the voice signal intelligibility and the intelligibility limit are discussed, and the methods to measure intelligibility are examined. While intelligibility is defined as a percentage, the corresponding limit is defined as the perturbation condition for which intelligibility is reduced to 50%, expressed as signal level or signal to noise ratios. The measuring method varies with the type of phoneme used (meaningless phrases, rhymed works, or normal speech). Intelligibility curves for the three methods are given.

N82-31618/3 PC **A04**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Spectral Analysis of Psk Signals and the Development of Microwave Modulators Analise Espectral de Sinais Psk E Projeto de Moduladores Em Microondas.
M.S. Thesis.
E. A. P. Tude. Mar 82, 69p INPE-2339-TDL/082
Text in Portugese. Original Contains Color Illustrations.

The PSK signal produced by carrier modulation in microwave frequency is analyzed for the PSK spectrum with several kinds of digital signals, and the construction of a phase modulator in microwaves using PIN diode phase shifters is studied. A prototype in 1,2 GHz was built to investigate the PSK signal and the use of pre and pos modulation filters to reduce the band.

PB83-107300 PC **A02**/MF **A01**
Helsinki Univ. of Technology, Espoo (Finland). Dept. of Technical Physics.
A Method to Solve Dead-Lock Problems in Multiprocessor Realizations of Digital Signal Processing Algorithms.
O. Simula. 20 Feb 80, 23p TKK-F-A410, ISBN-951-751-892-7
Also pub. in ISSN-0355-7790.

In this paper a method to solve dead-lock problems in multiprocessor realizations of digital signal processing algorithms is presented. The precedence relations defining the order of computations in the signal flow diagram are introduced. Using the precedence relations it is shown how to predetermine the sequence of computations on each processor in such a way that deadlock situations are avoided. Further it is shown that under certain conditions it is possible to distribute the computations to separate processors so that the entire multiprocessor configuration will be free from deadlocks. The method can easily be included into the computer aided design of multiprocessor systems using the modified Petri nets.

PB83-852541 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Facsimile Communication. June, 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 210p
Supersedes PB82-856964.

This bibliography contains citations concerning facsimile telecommunication methods, systems, and apparatus used in commercial, institutional, and governmental applications. Considerable attention is given to the nature of information being transmitted with relation to equipment types and system capabilities. (This updated bibliography contains 172 citations, 15 of which are new entries to the previous edition.)

17D. Electromagnetic and Acoustic Countermeasures

AD-A119 557/7 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
The Application of Fuzzy-Set Theory to the Burnthrough Range Equation.
Interim rept.,
F. Gross, D. J. Hanrahan, and S. T. Hood. 14 Sep 82, 22p Rept no. NRL-8619

Uncertainty of parameters in the burnthrough range equation is nonstatistical. Fuzzy-set theory may be a better means of treating such uncertainty than the usual personal-probability (degree-of-belief) approach. Analytical and computer methods are presented and exemplified for computation of the burnthrough range as a fuzzy quantity when some of the radar parameters are uncertain. The methods are generally applicable to any fuzzy equation where suitable substitutions can be made. (Author)

AD-A119 703/7 PC **A04**/MF **A01**
Fairleigh Dickinson Univ., Hackensack, NJ. Physics Research Lab.
Powder Spectroscopy in the Infrared Spectral Region.
Final rept. 1 Jun 79-31 May 82,
V. P. Tomaselli, and K. D. Moeller. Jul 82, 61p ARO-16908.2-GS-A
Contract DAAG29-79-C-0130

Experimental work is reported in the following areas: evaluation of infrared optical properties of obscurants using reflection and transmission methods; development of instrument components for a millimeter wave spectrometer; development of laser-based instrument for the measurement of optical constants of powders using internal reflection techniques; and construction of apparatus to measure the angular distribution of infrared laser radiation scattered from infinitely long conducting wires. The following projects were completed and resulted in publications: infrared optical constants of carbon powders determined from reflection measurements; far-infrared band pass filters; and far-infrared absorption of thiophene in the liquid and plastic phases. (Author)

PATENT-4 336 541 Not available NTIS
Department of the Air Force, Washington, DC.
Simultaneous Signal Detector for an Instantaneous Frequency Measurement Receiver.
Patent,
James B. Y. Tsui, Rudy L. Shaw, and Joseph Caschera. Filed 8 Aug 80, patented 22 Jun 82, 7p
AD-D009 721/2, PAT-APPL-6-176 434
Supersedes PAT-APPL-6-176 434, AD-D007 683.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This report describes an apparatus for use in conjunction with an instantaneous frequency measurement (IFM) receiver, for detecting the presence of two or more RF signals, differing in frequency, between the onset of the first RF signal pulse and the completion of the frequency encoding strobe. High frequency sample and hold circuits detect the level of the video upon stabilization of the leading edge of the first received pulse. Thereafter, comparators monitor both the video and sampled levels to detect defined differences therebetween. Monitoring ceases at the termination of the frequency encode strobe. Ambiguities in the encode frequency are detected by comparator unbalances, which actuate the inputs to a logic OR gate. The output of the OR gate is connected to a logic AND gate, whose other input changes in level upon the termination of the encode strobe. The output of the AND gate latches an alarm, signalling the IFM receiver that the frequency measurement is ambiguous.

17E. Infrared and Ultraviolet Detection

AD-A119 775/5 PC **A03/MF A01**
Lake Shore Cryotronics, Inc., Westerville, OH.
A Low Resistance Infrared Bolometer for Use with a SQUID Detection System.
Final rept. 1 Apr-31 Jul 82,
Philip R. Swinehart. 24 Sep 82, 48p
Contract N00014-82-C-0286

Low resistance thin film bolometers for infrared detection when impedance matched to a SQUID amplifier were fabricated from a range of gold/germanium alloys (12 to 25 atomic per cent gold). The low resistances of 0.1 to 0.2 ohms, including contact resistances, were obtained in the direction perpendicular to the film plane. High resistance versions with conduction parallel to the film plane were fabricated simultaneously. The resistance for the parallel conduction was characteristic of a semiconductor, but for the perpendicular mode it was characteristic of a metal. Available data suggests that the metallic conduction was caused by uncontrolled gold particle sizes which could equal the thickness of the film. (Author)

N82-32133/2 PC **A02/MF A01**
Cornell Univ., Ithaca, NY. Center for Radiophysics and Space Research.
Stress Induced Long Wavelength Photoconductivity in Doped Silicon Infrared Detectors.
Final Technical Report, 1 Nov. 1980 - 28 Feb. 1982.
J. R. Houck. Aug 82, 8p NAS 1.26:169277, NASA-CR-169277
Contract NAG2-70

The long wavelength cutoff of a Si:P detector was extended to 34 microns by the application of a uniaxial stress. An unstressed Si:P photoconductive detector responds to photons of up to 28 microns wavelength. By applying a uniaxial stress to a detector along the / 100/ crystal axis, the response was extended to approximately 34 microns. The /100/ axis was chosen as the stress direction because theoretical calculations predicted that such a stress extends the wavelength response more than one along the /110/ axis. These theoretical calculations were based upon fits to experimental data obtained at stresses of up to approximately kbar, and indicated that the extension in wavelength response continues to increase at much larger stresses.

17G. Navigation and Guidance

AD-A119 440/6 PC **A08/MF A01**
Salford Univ. (England). Dept. of Aeronautical and Mechanical Engineering.
Design of High-Performance Tracking Systems.
Technical rept. 15 Nov 80-30 Sep 81,
Brian Porter. 1 Jul 82, 174p USAME/DC/120/81, AFWAL-TR-82-3032
Contract F49620-81-C-0026

Conceptually and computationally simple methods for the design of high-performance tracking systems are described. These methods ae equally applicable to the design of both analogue and digital controllers, and are based upon the exploitation of a solitary system-theoretic result from the singular perturbation analysis of transfer function matrices. Illustrative examples involving the design of tracking systems incorporating both high-gain analogue controllers and fast-sampling digital controllers are presented. (Author)

AD-A119 578/3 PC **A04/MF A01**
IIT Research Inst., Annapolis, MD.
EMC Analysis of a Prototype Civil-Use GPS Receiver on Four Aircraft Configurations.
Consulting rept.,
Robert L. Mullen. Jul 82, 73p DOT/FAA/RD-82/63, ECAC-CR-82-048
Contract F19628-80-C-0042

The analysis for each aircraft addressed the potential of interference from adjacent-signal and out-of-band transmitters. Adjacent-signal transmitters aboard the four aircraft configurations consisted of Distance Measuring Equipment interrogators, Air Traffic Control Radar Beacon System transponders, Mode S transponders, and Traffic Alert and Collision Avoidance System interrogators. The out-of-band transmitters included HF, VHF, and UHF communications equipment. The electromagnetic compatibility aspects of the GPS receiver that were examined included burnout and saturation of the limiting diode in the receiver front end, interference to signal acquisition, and interference to signal code and carrier tracking. Only radiated interference coupled from the transmit antenna to the receive antenna was examined in this analysis. Conducted interference was not considered. For the specific configurations analyzed, no potential instances of burnout or saturation of the limiting diode due to signals from individual or multiple on-board transmitters were identified. For the specific configurations analyzed, no potential instances were identified in which the interfering signal from an individual on-board transmitter exceeded the GPS interference thresholds. For the specific configurations analyzed, one potential instance was identified in which the composite interfering signal from multiple on-board transmitters exceeded the GPS interference threshold for C/A signal acquisition. Alternative actions were recommended to preclude the occurrence of interference to the GPS receiver.

AD-A119 598/1 PC **A05/MF A01**
COMSIS Corp., Mountain View, CA.
ARTS IIA Design Analysis.
Final rept. May 81-June 82,
M. Tashker, M. Bell, and W. Chapel. Jun 82, 100p
CMSS-MV-82-01, DOT/FAA/RD-82/54
Contracts DTFA01-81-Y-10526, SB9-448(a)81-C-480

This report documents the analysis performed by the COMSIS Corporation and SRI International of the proposed design for the ARTS IIA air traffic system for terminal areas with low to medium traffic density. ARTS II will be upgraded to ARTS IIA with the replacement of the LSI-2/20 minicomputer by the LSI-2/40, which is faster and has more memory capacity, and the addition of minimum safe altitude warning (MSAW), conflict alert (CA), a tracker to support these, and a training target generator (TTG). The study addressed the use of semiconductor memory in an air traffic system and the requirement for a battery backup power supply. The algorithms for the enhancements were studied to determine whether the LSI-2/40 has sufficient speed to perform them under traffic and display loads expected in 1990. It is concluded that the replacement computer has the capacity to perform the enhancement functions under maximum target and display load for the expected air traffic environment. (Author)

AD-A119 623/7 PC **A06/MF A01**
Naval Postgraduate School, Monterey, CA.
A Sensitivity Analysis of the Kalman Filter as Applied to an Inertial Navigation System.
Master's thesis,
Gary Glen Potter. Jun 82, 105p

A tactical missile with mid-course requires the use of an Inertial Navigation System (INS). Steady-state Kalman Filters (SKF) used as estimators have been proposed for use in a Strapdown INS that is considered to be cheaper and easier to implement than a gimbaled INS. This thesis further investigates the sensitivity of the SKF to inaccuracies in the filter parameters such as the dimensional stability derivatives. The analysis is expanded to explore the sensitivity of a system of higher dimension created by the augmentation of an additional state. The study has been performed by independently varying each of the filter parameters over a given range and noting the effect on the accuracy of the filter. One of the benefits of this analysis of the rms estimate errors to variations in the stability derivatives is that it reveals which derivatives need to be accurately determined to ensure stable flight. (Author)

AD-A119 634/4 PC **A02/MF A01**
Virginia Univ., Charlottesville. Dept. of Mechanical and Aerospace Engineering.
Eigensolution Reanalysis of Rotor Dynamic Systems by the Generalized Receptance Method.
Technical rept.,
A. B. Palazzolo, Bo Ping Wang, and W. D. Pilkey. 1982, 11p Rept no. A-82-2
Contract N00014-75-C-0374
Pub. in The American Society of Mechanical Engineers, 10p.

No abstract available.

AD-A119 700/3 PC **A06/MF A01**
Charles Stark Draper Lab., Inc., Cambridge, MA.
Low Altitude Navigation Augmentation System.
Final technical rept. Sep 80-Aug 81,
D. Alexander Koso. Dec 81, 114p CSDL-R-1526, AFWAL-TR-81-1222
Contract F33615-80-C-1209

The Low Altitude Navigation Augmentation Concept provides the pilot with an electronic map display on the aircraft's HUD, so that head down operations (looking at maps or moving map displays) are not required. In addition to the display concept, bearing measurements to known landmarks can be utilized to update the navigation system and also to estimate errors between the navigation system coordinate frame and the map coordinate frame. The concept for the LANA was developed by CSDL under IR&D funding to determine the lowest performance INS usable in the LANA configuration. The simulation configuration described in this plan, however, utilizes higher performance equipment; since the higher performance equipment will be procured for the F-16 and A-10 aircraft. In this report, a plan is developed to simulate the LANA concept on an Air Force simulator. The simulation will be used to verify both system performance and pilot work load unde realistic flight conditions.

AD-A119 743/3 PC **A07/MF A01**
Ohio Univ., Athens. Avionics Engineering Center.
The Effects of Precipitation Static and Lightning on the Airborne Reception of LORAN-C. Volume I. Analysis.
Final rept. 11 Dec 80-30 Apr 82,
James D. Nickum. Apr 82, 139p OU/AEC/EER-54-2, DOT/FAA/RD-82/45-1
Contract DTFA01-81-C-10007

Results of a ground p-static survey of an aircraft to determine p-static noise reduction are given. The effects of the airborne reception Loran-C in actual thunderstorm conditions are described. Additionally, data from flight tests conducted using an airframe biased discharger producing p-static airframe charging in flight are presented. P-static noise reduction using quality static-wick dischargers to improve Loran-C reception in flight is demonstrated. (Author)

N82-31761/1 PC **A04/MF A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
An Image Processing Method for Position Estimation: A Maximum Likelihood Approach.
D. Andree, and A. Wernersson. Apr 82, 70p FOA-C-30273-E1

A method which uses image information when updating a fully automated navigational system was studied. The method was tested using LANDSAT images. Well defined contours are found for each scan. Estimated contours are compared with prestored contours. The position estimate is the maximum likelihood estimate of the contour coordinates. For test data with a signal to noise ratio (SNR) of 3, a very distinct estimate is obtained. For SNR = 0.65 a correct, but less distinct, minimum is obtained, which can be improved by using the correlation properties of the image.

PAT-APPL-6-370 755 PC **A03/MF A01**
Department of the Navy, Washington, DC.
Fiber Optic Gyroscope with Alternating Output Signal.
Patent Application,
Scott C. Rashleigh. Filed 22 Apr 82, 30p AD-D009 715/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention relates generally to Sagnac fiber-optic rotation-sensing interferometers and more particularly to a Sagnac fiber-optic rotation-sensing interferometer which produces an alternating output signal. The Sagnac rotation sensing interferometer uses a Mach-Zehnder interferometer to provide incident light beams that counter-propagate through an optical-fiber loop. The Sagnac interferometer operates at maximum sensitivity for zero rotation rates when the Mach-Zehnder is adjusted so that the intensities of the incident light beams are equal. By periodically varying the position of a mirror in the Mach-Zehnder the interferometer is switched into and out of quadrature so that the amplitude of the interferometer output signal is modulated at frequency f(o). Phase sensitive detection

at f(o) reduces the background noise level several orders of magnitude below the level for dc operation.

17H. Optical Detection

AD-A119 714/4 PC A02/MF A01
Army Engineer Topographic Labs., Fort Belvoir, VA.
Effects of Ground Cover and Leaf Area on the Spectral Reflectance of Vegetation-Soil Target,
Melvin B. Satterwhite, and Ponder Henley. 23 Sep 82, 12p Rept no. ETL-R039

The relations between spectral reflectance, percent ground cover, and leaf area index (LAI) for vegetation-soil targets were evaluated for green vegetation against either a light-toned sand and a dark-toned organic loam soil. The percent ground cover and LAI were calculated for the ground area in the radiometer's field of view. The special reflectances of the different targets were measured in the 400 to 1100 nm region. For the vegetation-organic loam targets, the present cover and LAI varied directly with the target reflectance in the green (520-600 nm) and the infrared (700-1100 nm) regions, but varied inversely with reflectance in the red region (650-700 nm). For the vegetation-sand targets, the percent cover and LAI varied inversely with reflectance in the visible region and directly in the IR region. Results show that the major change in reflectance of vegetation-soils was related more to the change in percent cover. For less than 100 percent cover, the LAI varied directly with percent ground cover. A change in LAI produced less change in target reflectance than did a change in percent cover. Once the canopy is closed, i.e., 100 percent cover, variation in LAI had little effect. (Author)

17I. Radar Detection

AD-A119 536/1 PC A07/MF A01
ITT Gilfillan, Van Nuys, CA.
Frequency Scanning Radar Concepts for Army High Energy Laser Weapons. Volume I. HELVADS/FALW/FALW-D.
Final rept. Apr 81-Feb 28,
C. Barfield, D. Epps, and S. Howard. Apr 82, 129p
Contract DAAH01-81-C-A782
See also Volume 2, AD-C028 878.

The data presented in this volume consists of concepts, design approaches, configurations and analyses with recommendations for frequency scanning radars compatible with the target acquisition subsystem requirements of the HELVADS, FALW and FALW-D weapon systems. In arriving at recommendations for the three subsystem requirements, a number of candidates were examined and reported on in the monthly progress reports. These candidate configurations for FSR's, with brief descriptions indicating the more important advantages, disadvantages and reasons for recommendation or non-recommendation have been included. In those instances where an overall acquisition subsystem group is shown as opposed to strictly FSR configurations, brief descriptive data for those elements other than FSR data was included, however, time and scope of effort limited data to the level necessary only to provide an understanding of the group concept. (Author)

AD-A119 746/6 PC A02/MF A01
Naval Research Lab., Washington, DC.
Effects of Bandwidth Limitation on Polyphase Coded Pulse Compression Systems.
Interim rept.,
B. L. Lewis, F. F. Kretschmer, Jr., and F. C. Lin. 20 Sep 82, 17p Rept no. NRL-8625

The effects of both pre- and postcompression bandwidth limitations on frequency-derived polyphase-coded pulse compressors are illustrated. Such band limitation is found to decrease the peak to maximum range-time-sidelobe ratios of the Frank and P3 coded compressor outputs but to significantly increase the ratio using the P1, P2, and P4 codes. The band limited P1, P2, and P4 coded systems were found to produce peak to maximum sidelobe ratios close to those of so-called perfect codes such as the Barker codes without restrictions on pulse-compression ratios. (Author)

DE82009343 PC A03/MF A01
Sandia National Labs., Albuquerque, NM.
Radar Echo from a Flat Conducting Plate - Near and Far.
C. S. Williams. Jan 82, 44p SAND-81-2561
Contract AC04-76DP00789
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Over certain types of terrain, a radar fuze (or altimeter), by virtue of the horizontal component of its velocity, is likely to pass over various flat objects of limited size. The echo from such objects could have a duration less than that of one Doppler cycle, where the Doppler frequency is due to the vertical component of the velocity. If the terrain is principally made up of such objects, their echoes are in most cases entirely uncorrelated with each other. Hence, the total echo after mixing at the radar with the delayed transmitted wave would have a noise-like spectrum not at all confined to the Doppler-frequency band where the desired echo signal is expected. This would seriously degrade the performance of a radar that utilizes correlation. This work shows that the echo from a square flat plate will be of duration greater than the time it takes to pass over the plate if the height h above it satisfies h > a exp 2 /lambda where a is the plate-edge dimension and lambda is the radar wavelength. The results presented here can be used to determine the spatial region wherein the echo exists, and the magnitude and phase of the echo from such a plate. I infer from these results that the case where the signal has a noise-like spectrum is not impossible but it is unlikely for the applications with which I am familiar. (ERA citation 07:044358)

N82-31601/9 PC A03/MF A01
Marconi Space and Defence Systems Ltd., Camberley (England).
Active Microwave Instrument Optimisation Study. Volume 1: Executive Summary.
Final Report.
Nov 81, 37p MTR-82/13, ESA-CR(P)-1581
Contract ESA-4866/80/F-DD(SC)
Sponsored in Cooperation with Emi-Varian LTD. And Mbb, Munich.

The overall active microwave instrument (AMI) system, the electronics, the RF switch matrix, the klystron, the SAR antenna, and configuration/thermal aspects were studied. It is shown that a common RF amplifying tube can be used for all three AMI functions (imaging SAR, wind scatterometer, wave scatterometer) if a common peak transmitted power of 10 kw is employed. Passive thermal control techniques can be used with standby heaters for thermal control of the high power amplifier.

17J. Seismic Detection

PATENT-4 337 528 Not available NTIS
Department of the Air Force, Washington, DC.
Moving Vehicle Seismic Target Detector.
Patent,
Glenn G. Clinard, and Gail R. Mulhollam. Filed 13 Dec 72, patented 29 Jun 82, 6p AD-D009 720/4, PAT-APPL-314 646
Supersedes PAT-APPL-314 646-72.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This report describes seismic detection of a target is obtained with a geophone detecting earth vibrations caused by the actions of the target. The vibrations are wide band amplified and band-passed filtered with the pass bands being fed to the threshold detectors. The outputs of the threshold detectors are fed to a diode AND logic circuit, the output thereof indicating the presence of a target.

18.
NUCLEAR SCIENCE AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

DE82001636 PC A02/MF A01
Lawrence Livermore National Lab., CA.
Notification of Change in a Data Base.
B. C. Nelson. 5 Oct 81, 3p UCRL-86122, CONF-811040-26
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, Chicago, IL, USA, 26 Oct 1981.

The Supervisory Control and Diagnostics System for the Mirror Fusion Test Facility is an event driven system; tasks that handle specific events are active only when those events occur. One method of monitoring and generating events is the data base notification facility; a task can request that it be loaded and started by the dbms if a data element is touched or goes outside of a specified range. The motivations for this facility (along with an example of its use and some specifics regarding how it is done) are presented. (ERA citation 07:006567)

DE82004702 MF A01
Brookhaven National Lab., Upton, NY.
Negative Ion Beam Formation, Transport and Acceleration.
J. G. Alessi. 1981, 3p BNL-30330, CONF-811040-129
Contract AC02-76CH00016
Symposium on engineering problems of fusion research, Chicago, IL, USA, 26 Oct 1981.
Best available copy from document source. Available in microfiche only.

The BNL Neutral Beam Development Group is working on the development of negative ion based neutral beam systems, using high current density surface plasma sources of the magnetron and hollow cathode discharge (HCD) type. With the magnetron source, the plan is to transport a 2A D exp - beam through a bending magnet before acceleration to 200 keV. In experiments with a pulsed magnetron, 0.4A of H exp - was transported through a 90 exp 0 , n = 1, bending magnet with 80% transmission. With the lower operating pressure in the HCD source, close coupled acceleration will be applied. The MEQALAC, RFQ, and a dc accelerating scheme with periodic quadrupole focusing are considered for reaching higher energies. A preliminary experiment was performed with quadrupole beam transport and a 3.8 mA beam was transported through a series of twelve quadrupoles, with 3 mm apertures and a total length of 7.2 cm. (ERA citation 07:048788)

DE82008609 MF A01
EG and G Idaho, Inc., Idaho Falls.
Development of a Nuclear Test Strategy for Test Program Element II.
G. A. Deis, P. Y. Hsu, J. L. Liebenthal, G. R. Longhurst, and L. G. Miller. Mar 82, 35p EGG-FT-5651
Contract AC07-76ID01570
Portions of document are illegible.
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As part of Phase O in Test Program Element II of the Office of Fusion Energy's First Wall/Blanket/Shield Engineering Test Program, a test strategy has been developed to address the blanket/shield's (B/S's) thermal-hydraulic and thermomechanical data needs, which were identified in an earlier task through the use of nuclear and supporting nonnuclear testing. In Phase

I, which extends through 1984, this strategy emphasizes the development of pre-design information and the nonnuclear supporting tests. After Phase I, nuclear testing will be emphasized, and B/S design-verification testing will become more important. The proposed program will investigate a solid-breeder-blanket concept via nuclear testing. This program can begin in Phase I with nonnuclear support tests, and can progress to integrated nuclear testing soon after the completion of Phase I. The program's approximate cost and schedule are presented. In addition, other possible areas of study for Phase I, and strategies for the use of nuclear and nonnuclear facilities after Phase I are outlined. (ERA citation 07:052359)

DE82008942 MF **A01**
Los Alamos National Lab., NM.
Four-Feedplate Operation of ZT-40 with Passive Crowbars.
D. A. Baker, C. J. Buchenauer, and L. C. Burkhardt. Jan 82, 156p LA-8752-MS
Contract W-7405-ENG-36
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This report summarizes the measurements made on the ZT-40 reversed-field pinch during the start-up on October 5, 1979, until May 1980, when the power crowbar circuitry became operational. The material contained herein pertains to the operation of ZT-40 with four current feedpoints, passive crowbars, and a nonconducting, high-purity alumina liner. The plasma properties are given for reversed-field pinches obtained either by aided or self-reversal and for nonreversed-field (stabilized) pinches. It is demonstrated that ZT-40 was capable of being ohmically heated to approx. 100 eV electron temperatures during the approx. 0.1 ms rise to peak current. Operation is obtained in which the fluctuations during start-up are observed to decrease later in the discharge, producing quiet periods of approx. 0.1 ms. (ERA citation 07:055851)

DE82009004 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Extracted Current Densities from Surface Conversion Sources of Negative Ions.
J. H. Fink. 10 Feb 82, 8p UCID-19330
Contract W-7405-ENG-48

The condition for extracting a maximum negative ion current density is found when the product of the radius of the negative ion conversion electrode, the cross-section for negative and positive ion recombination, and the density of positive ions in the ion source equals one. The optimum output is obtained at the highest positive ion density and the smallest electrode radius. (ERA citation 07:055885)

DE82009813 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign. Fusion Studies Lab.
FRTP Fusion Ignition Experiment.
G. H. Miley, Q. T. Fang, and J. G. Gilligan. 1982, 5p COO-2218-237, CONF-820609-23
Contract AS02-76ET52040
American Nuclear Society annual meeting, Los Angeles, CA, USA, 6 Jun 1982.

The Field-Reversed Theta Pinch (FRTP) represents a promising confinement approach to fusion power. This possibility has become more evident as a result of the favorable confinement scaling predicted by our studies of Loss-Cone Scattering Transport (LCST). Therefore, a step towards a FRTP prototype power reactor is proposed here that involves an ignition experiment designed to study confinement of a fusion grade plasma and the associated technology. In effect, this device would play a role similar to that proposed for the Fusion Energy Device (FED) in the Fusion Energy Act of 1980. However, the cost of the smaller FRTP experiment would be considerably less than the Tokamak-type FED now envisioned. (ERA citation 07:045317)

DE82011189 PC **A02**/MF **A01**
Sandia National Labs., Livermore, CA.
Tritium Permeation in Fusion Reactors: INTOR.
M. I. Baskes, W. Bauer, R. A. Kerst, W. A. Swansiger, and K. L. Wilson. Dec 81, 13p SAND-81-8264
Contract AC04-76DP00789

Tritium permeation through the first wall of advanced fusion reactors is examined. A fraction of the D-T which bombards the first wall as charge exchange neutral particles will permeate through the first wall and enter the coolant. Calculations of the steady state permeation rate for the US INTOR Tokamak design result in values of less than or equal to 0.002 grams of tritium per day under the most favorable conditions. For unfavorable surface conditions the rate is greater than or equal to 0.1 g/day. The magnitude of these permeation rates is critically dependent on the temperatures and surface conditions of the wall. The introduction of permeation barriers at the wall-coolant interface can significantly reduce permeation rates and hence may be desirable for reactor applications. (ERA citation 07:045367)

DE82011295 PC **A99**/MF **A01**
Oak Ridge National Lab., TN.
Fusion Engineering Device Design Description.
C. A. Flanagan, D. Steiner, and G. E. Smith. Dec 81, 690p ORNL/TM-7948/V.2
Contract W-7405-ENG-26
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The US Magnetic Fusion Engineering Act of 1980 calls for the operation of a Fusion Engineering Device (FED) by 1990. It is the intent of the Act that the FED, in combination with other testing facilities, will establish the engineering feasibility of magnetic fusion energy. During 1981, the Fusion Engineering Design Center (FEDC), under the guidance of a Technical Management Board (TMB), developed a baseline design for the FED. This design is summarized herein. (ERA citation 07:045364)

DE82011410 PC **A03**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Summary of the Alternate-Fuels Fusion-Reactor Workshop.
J. B. McBride. 18 Feb 82, 26p SAI-023-82-043LJ, APS-78, CONF–811228–Summ.
Contract AC03-81ER53113
Alternate fuels reactor workshop, La Jolla, CA, USA, 7 Dec 1981, Portions of document are illegible.
Microfiche only after original copies are exhausted.

The purpose of the workshop was to: (1) review progress, particularly during the period since the Germantown, MD workshop in January 1981, to determine where the alternate fuels (AF) community stands in relation to its goal of adequately assessing the potential of AF for fusion applications; (2) set technical directions and priorities for future work. Thus, the scope of the workshop was intentionally broad including discussion of numerous magnetic confinement concepts for AF (tokamak, mirror, RFP, multipoles, etc.) and both d-based and p-based fuel cycles so that all the major elements of the US program in AF could be considered in a single forum. (ERA citation 07:052405)

DE82012524 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
Operator-Generated Command Language for Computer Control of Doublet III.
D. Drobnis, and P. Petersen. Feb 82, 5p GA-A-16503, CONF-811040-183
Contract AT03-76ET51011
Symposium on engineering problems of fusion research, Chicago, IL, USA, 26 Oct 1981.

The Control System for Doublet III consists of a medium-sized minicomputer system, with several keyboards and color alphanumeric CRTs for interactive operator interface to a large distributed CAMAC I/O system. Under normal operating conditions, however, all of the sequential and decision-making operations necessary to prepare each tokamak shot are performed directly by the computer, executing a set of Procedures coded in a convenient command language. Most of these Procedures have been developed by the Doublet III operators themselves, and are maintained, altered, and augmented as required without programmer attention. In effect, the Procedures have become a high-level tokamak Command Language.

DE82012563 MF **A01**
General Atomic Co., San Diego, CA.
System-Wide Data Management for General Atomic's Doublet III Distributed Computer System.
A. S. Glad. Feb 82, 5p GA-A-16476, CONF-811040-181
Contract AT03-76ET51011
Symposium on engineering problems of fusion research, Chicago, IL, USA, 26 Oct 1981, Portions of document are illegible.
Microfiche copies only.

A continual increase in diagnostic data has yielded four problems which must be addressed and solved for the future: (1) the acquisition and processing of the large mass of data must be performed in a limited time frame and must extract and present in a useful manner a summary of information to permit intelligent experimental direction; (2) all diagnostic data for the life of an experiment must be archived with the ability to retrieve and analyze old or new data; (3) the data structures must be standardized to allow for exchanges of data internally within a laboratory and externally between laboratories. Fewer devices are being built with larger demands for data acquisition and analysis; and (4) the methods of accessing and analyzing data must be standardized between computing systems providing better utilization of an experimentalist's time and energy. General Atomic's Doublet III tokamak fusion experiment has addressed these problems utilizing a system-wide data base structure spanning multiple levels of computer processing. Presented in this paper are methods over these multiple levels of computer processing for standardizing the diagnostic data structures, standardizing the methods for accessing the data and providing the transferability of analysis tasks.

DE82012586 PC **A02**/MF **A01**
KMS Fusion, Inc., Ann Arbor, MI.
Brillouin Backscatter from Gas-Jet Targets Illuminated by a Multi-Line Laser Source.
G. E. Busch, and R. L. Maynard. 14 Apr 82, 6p KMSF-U-1190, CONF-820435-1
Contract AC08-78DP40030
CLEOS conference, Phoenix, AZ, USA, 14 Apr 1982.

Rotational Raman scattering of 532 nm, 100 psec pulses in hydrogen produces numerous spectral lines. This multi-line source has been characterized and used to study predicted reductions in Brillouin scattering from gas jet targets.

DE82012589 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
Expansion and Redundancy of the Doublet III Data-Acquisition Computer System.
B. B. McHarg, Jr. Feb 82, 5p GA-A-16473, CONF-811040-184
Contract AT03-76ET51011
Symposium on engineering problems of fusion research, Chicago, IL, USA, 26 Oct 1981.

The Doublet III Data Acquisition computer system acquires, achives, and processes approximately two and one-half megabytes of data in a five minute shot cycle of the Doublet III tokamak fusion experiment. The quantity of data acquired and processing performed in future fusion experiments and Doublet III in particular is certain to increase and will require greater reliability and efficiency in data handling. The current system consists of one minicomputer, four disk drives, two tape drives, one bulk memory unit, plus terminals, printers, and hard copiers. Recent experience indicates the need for improvement in two areas: user access to data and redundancy. The most heavily accessed data is from the most recent shot, and this data is accessed simultaneously for archiving, summarizing data, and user purposes. To speed up acquisition, improve access to data, and reduce contention for the same data on disk, it is planned to retain the most recent shot in a greatly expanded bulk memory unit. Also a second computer will be added devoted solely to data acquisition. The software design of the system will however be such that the acquisition system could be run with only one computer, consistent with the philosophy of redundancy. Redundant software design also includes the capability to switch data files between disk drives, to switch archiving of data between tape drives, and to write data directly to disk should the bulk memory unit fail.

DE82013464 MF **A01**
Oak Ridge National Lab., TN.

FED/INTOR Reactor Design Studies.
T. G. Brown, B. A. Cramer, J. P. Davisson, M. H. Kunselman, and W. T. Reiersen. Mar 82, 27p CONF-820368-1
Contract W-7405-ENG-26
FED/INTOR workshop on reactor design studies, Vienna, Austria, 22 Mar 1982, Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

Upon completing the design studies identified in this report, an overall assessment of the design options is made that will form the bases to define the configuration of the next major Tokamak device. The TF coil size will be defined, along with the vacuum boundary, the PF coil arrangement, and the torus configuration. After the configuration is established, an overall performance and cost re-assessment should be made to finally trade off device performance with machine capital and operating costs to establish a reactor design point for a given set of design requirements. (ERA citation 07:045316)

DE82014076 MF **A01**
Sandia National Labs., Albuquerque, NM.
Simple Theory for Maximum H Inventory and Release: A New Transport Parameter.
B. L. Doyle. 1982, 28p SAND-82-0241C, CONF-820545-3
Contract AC04-76DP00789
International conference on plasma surface, Gatlinburg, TN, USA, 3 May 1982, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

A simplified theory of hydrogen transport in materials is presented. The problem is formulated in terms of a dimensionless transport parameter, W = R sqrt phiK/ sub 0//D where R is the projected range, phi is the incident penetrating flux, K/sub 0/ is a phenomenological recombination coefficient and D is the diffusion coefficient for hydrogen in the material. Using this parameter, equations which describe recycle times, maximum hydrogen inventory and maximum hydrogen permeation are derived. This treatment yields simple analytic expressions for these quantities that are shown to be excellent approximations to the behavior obtained from exact numerical solutions. This transport parameter further results in a natural classification of the different types of behavior of hydrogen in materials.

DE82014088 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Extended Local Mixing Model for Hydrogen Retention and Isotope Exchange.
D. K. Brice, B. L. Doyle, and W. R. Wampler. 1982, 29p SAND-82-0058C, CONF-820545-1
Contract AC04-76DP00789
International conference on plasma surface, Gatlinburg, TN, USA, 3 May 1982.

The previously reported Local Mixing Model (LMM) for hydrogen retention and isotope exchange is extended to include thermal release of the hydrogen from its trap sites. In addition, a new mechanism for beam enhanced thermal transport (BETT) is described which accounts for a major portion of the thermal release at elevated temperatures. BETT involves the beam-induced promotion of trapped hydrogen from stronger traps to weaker traps and arises naturally from the basic concepts of the LMM. Comparison of the predictions of the model for hydrogen retention and isotope exchange at elevated temperatures in graphite and TiC show good agreement between experiment and theory.

DE82015190 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Evolution of the Tandem Mirror Reactor Concept.
G. A. Carlson, and B. G. Logan. 9 Mar 82, 24p
UCRL-87407, CONF-820347-2
Contract W-7405-ENG-48
US-Japan seminar/workshop (A-19) open systems studies, Nagoya, Japan, 15 Mar 1982.

We discuss the evolution of the tandem mirror reactor concept from the original conceptual reactor design (1977) through the first application of the thermal barrier concept to a reactor design (1979) to the beginning of the Mirror Advanced Reactor Study.

DE82015206 MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Theoretical and Applied Mechanics.
Magnetoelastic Instabilities and Vibrations of Superconducting-Magnet Systems.
F. C. Moon. Mar 82, 40p DOE/ET/52042-5, COO-2780-5
Contract AS02-76ET52042
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This report describes the research accomplished under Depatment of Energy/NSF grants associated with the structural design of superconducting magnets for magnetic fusion reactors. The main results pertain to magnetomechanical instabilities in toroidal and poloidal field magnets for proposed fusion reactors. One major accomplishment was the building and testing of a 1/75th scale superconducting structural model of a 16 coil Tokamak reactor. Using this model the buckling of toroidal and poloidal field coils under different constraints was observed. A series of dynamic tests were performed, including the effect of currents on natural frequencies, poloidal-toroidal coil interaction, and buckling induced superconducting-normal quench of the coils. The stability of poloidal coils in a toroidal magnet field were investigated with the 16 coil torus. A superconducting poloidal coil was observed to become statically unstable or buckle as the current approached a certain value. Magnetoelastic buckling of other magnet systems such as a yin-yang pair of magnets, Ioffe coils, and discrete coil solenoids were also studied.

DE82015823 MF **A01**
Naval Research Lab., Washington, DC.
Use of Finite J/sub theta/ for Increasing the Ion Efficiency of High-Impedance Diodes.
R. J. Barker, and S. A. Goldstein. 12 Apr 82, 38p
NRL-MR-4773
Contract AI01-77DP40042
Portions of document are illegible.
Available in microfiche only.

Numerical simulations predict that the ratio of the effective ion current to total diode current can be significantly increased by introducing a small but finite azimuthal current into the tip of the cathode shank of a high impedance (4 omega) axial pinch-reflex diode. Such a current generates large tangential magnetic fields along the electron-emitting cathode surfaces. These fields, in turn, impart a finite angular momentum to the electrons as they are injected into the anode-cathode gap. The resultant particle self-fields alter electron trajectories in such a way as to boost electron space charge near certain portions of the ion-emitting anode surface. The net consequence is a modification of the radial profile of ion emission which enhances the net ion current transmitted through the interior of the hollow cathode shank.

DE82700755 MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Research Reactors Div.
Analysis of the Estimated Capital Cost of a Fusion Reactor.
A. A. Hollis. Jun 81, 28p AERE-R-9933
U.S. Sales Only. Available in microfiche only.

The cost of building a fusion reactor similar to the Culham Conceptual Tokamak reactor Mark IIB is assessed and compared with other published capital costs of fusion and fission reactors. It is concluded that capital-investment and structure-renewal costs for a typical fusion reactor as presently conceived are likely to be higher than for thermal-fission reactors. (Atomindex citation 13:651891)

DE82700756 PC **A02**/MF **A01**
UKAEA Culham Lab., Abingdon (England).
Compression Experiments on the TOSKA Tokamak.
G. Cima, C. W. Gowers, H. Krause, K. M. McGuire, and D. C. Robinson. Oct 80, 23p CLM-R-213
U.S. Sales Only.

Results from minor radius compression experiments on a tokamak plasma in TOSCA are reported. The compression is achieved by increasing the toroidal field up to twice its initial value in 200 mu s. Measurements show that particles and magnetic flux are conserved. When the initial energy confinement time is comparable with the compression time, energy gains are greater than for an adiabatic change of state. The total beta value increases. Central beta values approximately 3% are measured when a small major radius compression is superimposed on a minor radius compression. Magnetic field fluctuations are affected: both the amplitude and period decrease. Starting from low energy confinement times, approximately 200 mu s, increases in confinement times up to approximately 1 ms are measured. The increase in plasma energy results from a large reduction in the power losses during the compression. When the initial energy confinement time is much longer than the compression time, the parameter changes are those expected for an adiabatic change of state. (Atomindex citation 13:651892)

DE82700758 MF **A01**
UKAEA Culham Lab., Abingdon (England).
Culham Conceptual Tokamak Mark II. Design Study of the Layout of a Twin-Reactor Fusion Power Station.
J. A. S. Guthrie, and N. H. Harding. Jul 81, 51p CLM-R-215
U.S. Sales Only. Available in microfiche only.

This report describes the building layout and outline design for the nuclear complex of a fusion reactor power station incorporating two Culham Conceptual Tokamak Reactors Mk.II. The design incorporates equipment for steam generation, process services for the fusion reactors and all facilities for routine and non-routine servicing of the nuclear complex. The design includes provision of temporary facilities for on site construction of the major reactor components and shows that these facilities may be used for disassembly of the reactors either for major repair and/or decommissioning. Preliminary estimates are included, which indicate the cost benefits to be obtained from incorporating two reactors in one nuclear complex and from increased wall loading. (Atomindex citation 13:651894)

DE82780430 PC **A02**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Boundary Conditions for Tokamak Transport Equations from Scrape-off Layer Modelling.
K. Borrass. Aug 80, 15p IPP-4/191
U.S. Sales Only.

A simple model for the scrape-off zone of a tokamak plasma, which can be treated analytically, is considered. It involves a description of space dependent parallel and perpendicular transport as well as ionization of neutrals. The information contained in this model can be fully transformed into boundary conditions for the bulk plasma. In the case of light particles and hydrogen, the boundary conditions relate the densities, the particle fluxes and the ionization rate at the boundary linearly to each other. In the case of heavy impurities densities and fluxes are related to the flux of neutrals coming from the wall. The model allows for the description of impurity shielding and a balance between inward and outward impurity diffusion at the boundary. The shielding efficiency of the scrape-off zone is found to be strongly determined by the hydrogen boundary condition. The model is to be used for the treatment of radiation layers in a ZEPHYR-like ignition experiment. (Atomindex citation 12:586734)

N82-32173/8 PC **A02**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik med Fusionsforskning.
Behavior of Oxygen Neutrals in the Boundary Region of Tokamak Plasma.
Research and Training Programme on Controlled Thermonuclear Fusion and Plasma Physics (EURNE).
M. Tendler. May 82, 22p TRITA-PFU-82-07, ISSN-0348-7644
Sponsored by Euratom.

Transport of oxygen atoms and molecules in a two-component plasma is considered. It is shown that the oxygen atoms consist of two components. One of them has a penetration depth typical of that of neutral hydrogen, while the other component has a penetration depth of the order of the total mean free path for the oxygen neutrals. The diffusion coefficient of the first ionization state of the oxygen is estimated and is shown to be enhanced by one order of magnitude as a result of penetrating the plasma.

18B. Isotopes

DE82013197 MF A01
Brookhaven National Lab., Upton, NY.
Cascades for Hydrogen Isotope Separation Using Metal Hydrides.
F. B. Hill, and V. Grzetic. 1982, 13p BNL-31042
Contract AC02-76CH00016
Available in microfiche only.

Designs are presented for continuous countercurrent hydrogen isotope separation cascades based on the use of metal hydrides. The cascades are made up of pressure swing adsorption (PSA) or temperature swing adsorption (TSA) stages. The designs were evolved from consideration of previously conducted studies of the separation performance of four types of PSA and TSA processes.

18D. Nuclear Instrumentation

DE82002305 PC A02/MF A01
Los Alamos National Lab., NM.
Detectors Using Secondary Emission Results: Anticipated Developments on Saturn 2 Surfaces.
R. Perret. 1981, 17p LA-tr-81-32
Contract W-7405-ENG-36
A Commissariat a l'energie Atomique, Institut National de Physique Nucleaire et Physique des Particules, 1977.

At the present time (and for the Saturn 2 project), the control of beams is accomplished by a network of ionization chambers (approx. = 35). These detectors are of the insertable type. The chambers allow adjustment of the beam (position, focusing, calculation of the flux density), but the matter of which they are composed most often makes it impossible to leave them for prolonged periods exposed to the beam. It was necessary to supplement the set of ionization detectors with another set of secondary emission detectors, a type of detector which can remain in the beam and which can, consequently, permanently ensure its visualization during experiments. A study was started on the secondary emission, the performance of the material and behavior of the vacuum in which the detector is inserted and we were able to construct a monitor, then a profile detector. (ERA citation 07:005294)

DE82006988 PC A02/MF A01
Los Alamos National Lab., NM.
Multiplicity Sorter for Shift-Register Coincidence Electronics.
J. E. Swansen, P. R. Collinsworth, M. S. Krick, and D. L. Peterson. Feb 82, 9p LA-9221-MS
Contract W-7405-ENG-36

A multiplicity sorter for the latest Los Alamos National Laboratory version of shift-register coincidence electronics is described. The multiplicity information taken from the coincidence-gate up-down counter is decoded and gated onto the output lines by prompt real-plus-accidental (R+A) and delayed accidental (A) strobes. Multiplicities of 0-7 and greater than or equal to 8 are sorted for both the R+A and A gates. (ERA citation 07:044561)

DE82009269 PC A02/MF A01
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Manually Controlled Neutron-Activation System.
R. A. Johns, and G. A. Carothers. Jan 82, 22p DP-1622
Contract AC09-76SR00001
Portions of document are illegible.

A manually controlled neutron activation system, the Manual Reactor Activation System, was designed and built and has been operating at one of the Savannah River Plant's production reactors. With this system, samples can be irradiated for up to 24 hours and pneumatically transferred to a shielded repository for decay until their activity is low enough for them to be handled at a radiobench. The Manual Reactor Activation System was built to provide neutron activation of solid waste forms for the Alternative Waste Forms Leach Testing Program. Neutron activation of the bulk sample prior to leaching permits sensitive multielement radiometric analyses of the leachates. (ERA citation 07:044542)

DE82012803 MF A01
Lawrence Livermore National Lab., CA.
Developments in Solid State Detectors for Personnel Neutron Dosimetry.
R. V. Griffith, K. J. Davidson, D. E. Miller, and K. E. Vindelov. 23 Jul 81, 9p UCRL-86509, CONF-810791-1
Contract W-7405-ENG-48
DOE personnel neutron dosimetry workshop, Louisville, KY, USA, 23 Jul 1981, Portions of document of illegible.
Available in microfiche only.

The personnel neutron exposure potential at the Lawrence Livermore National Laboratory is more diverse than at many other facilities, due to the wide range of neutron producing activities. Albedo energy response problems in the face of the diversity of sources, and a concern about possible photon interferences with the neutron albedo response, have prompted development of some additional dosimetry techniques to augment the personnel monitoring program. This work now consists of two programs - the dosimeter/spectrometer (DOSPEC) in which track etch detectors are added to the albedo badge to provide some energy evaluation and gamma insensitivity, and development of solid state thin film MOS detectors to provide a real time, gamma insensitive dosimeter. (ERA citation 07:044569)

DE82013300 MF A01
Los Alamos National Lab., NM.
One Gigasample Per Second Transient Recorder: A Performance Demonstration.
T. E. Linnenbrink, D. A. Gradl, D. M. Ritt, G. J. DeWitte, and J. D. Hutton. 1982, 4p LA-UR-82-837, CONF-820708-2
Contract W-7405-ENG-36
IEEE annual conference on nuclear and space radiation effect, Las Vegas, NV, USA, 20 Jul 1982.
Microfiche copies only.

The performance demonstrated by a one gigasample per second (1 Gs/s) transient recorder currently in advanced development portends an important new instrument for recording single transient data. A Charge-Coupled Device (CCD) is used to sample a continuous analog signal. Samples acquired at the full sampling rate (1 Gs/s) are temporarily stored in the CCD, then read out at a slow rate (e.g., 250 Ks/s) into a conventional analog-to-digital converter prior to storage in nonvolatile, digital memory. Enhanced circuitry and techniques developed over the past three years have yielded higher performance than originally anticipated. Accordingly, the target specification has been revised to reflect higher expectations.

DE82014525 PC A02/MF A01
Sandia National Labs., Albuquerque, NM.
Photoelectric Detector (PED) Improvements.
J. T. Martin. Mar 82, 9p SAND-82-0477
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

Photoelectric detectors used on previous experiments have a response time of approx. 0.8 ns; the latest models have response times of less than or equal to 0.5 ns. The thoughts, steps, and methods used to arrive at these improvements are detailed. (ERA citation 07:044566)

DE82014894 PC A03/MF A01
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Gamma Densitometer for Measuring Pu Density in Fuel Tubes.
W. G. Winn. Jan 82, 49p DP-1599
Contract AC09-76SR00001

A fuel-gamma-densitometer (FGD) has been developed to examine nondestructively the uniformity of plutonium in aluminum-clad fuel tubes at the Savannah River Plant (SRP). The monitoring technique is gamma -ray spectroscopy with a lead-collimated Ge(Li) detector. Plutonium density is correlated with the measured intensity of the 208 keV gamma -ray from exp 237 U (7d) of the exp 241 Pu (15y) decay chain. The FGD measures the plutonium density within 0.125- or 0.25-inch-diameter areas of the 0.133- to 0.183-inch-thick tube walls. Each measurement yields a density ratio that relates the plutonium density of the measured area to the plutonium density in normal regions of the tube. The technique was used to appraise a series of fuel tubes to be irradated in an SRP reactor. High-density plutonium areas were initially identified by x-ray methods and then examined quantitatively with the FGD. The FGD reliably tested fuel tubes and yielded density ratios over a range of 0.0 to 2.5. FGD measurements examined (1) nonuniform plutonium densities or hot spots, (2) uniform high-density patches, and (3) plutonium density distribution in thin cladding regions. Measurements for tubes with known plutonium density agreed with predictions to within 2%. Attenuation measurements of the 208-keV gamma -ray passage through the tube walls agreed to within 2 to 3% of calculated predictions. Collimator leakage measurements agreed with model calculations that predicted less than a 1.5% effect on plutonium density ratios. Finally, FGD measurements correlated well with x-ray transmission and fluoroscopic measurements. The data analysis for density ratios involved a small correction of about 10% for gamma -shielding within the fuel tube. For hot spot examinations, limited information for this correction dictated a density ratio uncertainty of 3 to 5%.

DE82014997 PC A02/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Dynamic Positron Emission Tomography in Man Using Small Bismuth Germanate Crystals.
S. E. Derenzo, T. F. Budinger, R. H. Huesman, and J. L. Cahoon. Apr 82, 14p LBL-14308, CONF-820434-8, CONF--820456--1
Contract W-7405-ENG-48
International conference on positron annihilation, Arlington, TX, USA, 3 Apr 1982.

Primary considerations for the design of positron emission tomographs for medical studies in humans are the need for high imaging sensitivity, whole organ coverage, good spatial resolution, high maximum data rates, adequate spatial sampling with minimum mechanical motion, shielding against out of plane activity, pulse height discrimination against scattered photons, and timing discrimination against accidental coincidences. We discuss the choice of detectors, sampling motion, shielding, and electronics to meet these objectives.

DE82015493 PC A03/MF A01
Sandia National Labs., Albuquerque, NM.
Ion-Trajectory Simulations for a Proposed Time-of-Flight Mass Spectrometer.
B. M. Marder, and G. W. McClure. May 82, 32p SAND-82-0433
Contract AC04-76DP00789

Intense focused ion beams are being developed as a means of achieving inertial confinement fusion. A time-of-flight mass spectrometer will be used to determine the ion composition of the beam. The design of this device is being aided by computer simulations which give the ion trajectories.

DE82701131 MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Methods for Processing gamma -Ray Spectra of Isolated Neutron Resonance Decay.
S. A. Telezhnikov. 1981, 8p JINR-R-10-81-358
In Russian.
U.S. Sales Only. Available in microfiche only.

A method for processing gamma -ray spectra which correspond to a decay of a large number of neutron resonances is discussed. The distinct features of the low- and high-energy parts of the gamma -ray spectra with Esub(gamma)<800 keV and Esub(gamma)>3 MeV, respectively, are taken into account. The algorithm for analytical description of symmetrical and nonsymmetrical peaks is given. Attention is paid to the analysis of mutual relations among various parameters and to the use of these relations in an attempt to reduce the number of free parameters. The algorithms of SPANAL and LINFIT programs are briefly described. The first program serves for the search for individual peaks in spectra, while the second is devoted to a final decomposition of spectra. (Atomindex citation 13:657274)

DE82701132 PC A02/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of Radiation Safety.

Sensitivity of the Thermal Neutron Detectors with Moderators.
V. E. Aleinikov, V. A. Arkhipov, L. G. Beskrovnaya, M. M. Komochkov, and Yu. V. Mokrov. 1981, 8p JINR-R-16-81-393
In Russian.
U.S. Sales Only.

The sensitivity of LiJ(Eu) detector in polyethylene moderators of various diameter and DN-A-1 dosimeter within fractions up to hundreds of eV energy region is determined. The results of calculations and measurements of these detector sensitivities performed by other authors within the energy range from thermal up to ultrafast are presented. The data presented are compared and regions of sensitivity function values are defined in which most reliable values could be located. It is shown that in the neutron energy range from eV fractions up to tens keV the DN-A-1 dosimeter has a satisfactory dosimetric characteristics. (Atomindex citation 13:657275)

DE82701133 MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Spectrometer for Measuring Nuclear Reactions Heavy Products.
V. Z. Maidikov, V. Noibert, N. K. Skobelev, and N. T. Surovitskaya. 1981, 10p JINR-R-7-81-140
In Russian.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

A combined heavy reaction product spectrometer capable of operation at zero degree is described. It performs the simultaneous analysis of charged particles according to several parameters: magnetic and electrical rigidity, time of flight and kinetic energy. The spectrometer selectivity was tested by measurement of the exp 197 Au recoil nuclei elastically scattered at 0 exp 0 +-0.5 deg from a gold target by a 175 MeV exp 40 Ar ion beam and was found to be 10 exp -13 . (Atomindex citation 13:657276)

DE82701137 MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Blocks for Multicontroller Organization in the SUMMA System Crate.
B. Yu. Baldin, V. N. Govorun, A. K. Konoplyannikov, V. G. Rybakov, and V. A. Sen'ko. 1981, 24p IFVE-OEA-81-84
In Russian.
U.S. Sales Only. Available in microfiche only.

A crate controller and auxiliary ones worked out in accordance with the standard multicontroller organization in the crate are described. Auxiliary controller for information read out from the drift chambers allows to operate out the receivers with only useful information, to recombine and write it into buffer. Auxiliary interface provides the connection between a micro-computer based on the 8 bit microprocessor with the SUMMA system in the programmed operational mode and in the DMA mode. (Atomindex citation 13:657361)

DE82701139 MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Nanosecond Spectrometric Amplifier.
G. B. Dzyubenko. 1981, 4p ITEF-70(1981)
In Russian.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Nanosecond amplifier intended for operation together with spectrometric amplifiers under conditions of high and changing-in-time loads is described. Zero drift at the amplifier output is <= 200 mu V/C exp 0 . Output pulse rise time equals 3 ns at 25 Ohm load resistor and 1.5 ns at 50 Ohm load resistor. A specific feature of the given amplifier is using at the amplifier input a complementary pair of transistors having equal gain with an accuracy of up to 5%. This permits to obtain a potential at the circuit input practically equal to zero and lightly depending on temperature. Besides in this amplifier the input resistance increases considerably and circuit linearity increases as a whole. Proper amplifier voltage factor equals 10. (Atomindex citation 13:657373)

DE82701141 MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods.
Controller for Data Readout and Coding for Coordinate Proportional Detectors.
T. V. Bespalova, I. A. Golutvin, and D. A. Smolin. 1981, 7p JINR-10-81-412
In Russian.
U.S. Sales Only. Available in microfiche only.

The controller for data serial readout and coding from 2048 wire proportional chambers is described. The controller provides cluster regime of particle tracks coding. Two read-out modes are guaranteed: in the normal mode 4 mm registration step and in the multiplex mode - 2 mm. The readout time depends on generator frequency and equals approx. 400 mu s for 2048 wires. The monitoring of device operation goes both via external signals, and via computer commands. Total controller circuit is located in double width CAMAC unit with one mounting plate. (Atomindex citation 13:657375)

DE82701142 MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Multichannel Charge-to-Digital Converter for Scintillation and Cherenkov Counter Hodoscopes.
S. G. Basiladze, and L. Lokhonyan. 1980, 6p JINR-13-80-703
In Russian.
U.S. Sales Only. Available in microfiche.

A multichannel charge-to-digital converter for processing scintillation and Cherenkov counter signals is described. It consists of 16-channel charge-to-time converters of 256 pC/20 mu s full-scale range and a 10-bit time-to-digital converters (TDC) recording up to 16 time intervals. TDC is capable to process signals from 4 charge-to-time converters (i.e. 64 input channels) performing suppression of signals that correspond to the conversion pedestal. Hence, efficient readout from TDC possible by reading only those channels which contain non-zero data. High stability and linearity along with the fast clear input providing the system reset within 1.5 mu s are the advantages of the above converter. (Atomindex citation 13:657376)

DE82701145 MF **A01**
Nauchno-Issledovatel'skii Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
Data Acquisition System Based on the 15 VSM-5 Microcomputer.
V. V. Golushko, V. S. Dunaev, E. P. Lepeshev, and K. L. Shkokova. 1981, 19p NIIAR-23(476)
In Russian.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Data acquisition system based on the programmable 15 vsm-5 microcomputer is described. Data are accepted from transducers and recorded on a magnetic tape for subsequent processing on the BESM-6 computer. The system comprises transducers, signal commutator, analog-to-digital converter (ADC), magnetic tape recorder "Majak-203", the "CONSUL-260" printer and is controlled by specially developed microprograms placed in a 15 VCM-5, permanent memory device. Magnetic tape recording reading unit and interface are developed through which microprograms control the whole system. Besides transducer data, two control numbers corresponding to "zero" and middle of the range of numbers accepted from the ADC are recorded on the magnetic tape. By means of control numbers the ADC reading drift is determined and corrected at processing. For ensuring data reliability the recorded data are controlled. The minimum inquiry period is 5 ms for each transducer. The magnetic tape can be used for recording dode digit binary or hexadigit binary-decimal codes. The measuring accuracy is determined by ADC accuracy and equals 0.2%. (Atomindex citation 13:657379)

DE82780443 MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Central Detectors.
A. Wagner. Sep 80, 23p DESY-80/83, CONF-800684-15
International conference on experimentation at LEP, Uppsala, Sweden, 16 Jun 1980.
U.S. Sales Only. Available in microfiche only.

A review is given about the drift chambers used at the PETRA storage ring. The conditions are discussed which limit the spatial resolution of these chambers. The electronics of these chambers are described. The particle identification through measurement of the energy losses in the drift chamber as well as the calibration of this chamber are discussed. (Atomindex citation 12:589199)

DE82780492 MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Proceedings of a Meeting on the Application of Holographic Techniques to Bubble Chamber Physics, 19-20 January 1981 (At the Rutherford and Appleton Laboratories).
R. L. Sekulin. May 81, 301p RL-81-042, CONF-810165-
Meeting on the application of holographic techniques to bubble chamber physics, Chilton, UK, 19 Jan 1981.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Separate abstracts are prepared for 16 papers in this conference proceedings. (ERA citation 07:047902)

DE82902866 MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil). Centro de Operacao e Utilizacao do Reator de Pesquisas.
Trapping Effect on the Resolution of Ge(Li) Detectors.
L. Venturini, and A. A. Suarez. Sep 81, 13p IPEN-Pub-34
Portions of document are illegible.
Microfiche copies only. U.S. Sales Only.

The energy resolution variation measurement of a Ge(Li) detector as a function of irradiation position by a collimated gamma-ray beam is described. In addition, the resolution dependence has been measured as a function of the detector applied voltage, using collimated and non-collimated gamma-ray beams. The measurements indicate that in the charge collection process and at the detector operation voltage, the loss of holes predominates and the best resolution is obtained in the middle of the compensated region. The dependence of the resolution on the irradiation position can be accounted for by introducing a local ionization factor different from the usual position independent Fano factor. (ERA citation 07:044553)

18E. Nuclear Power Plants

DE82006729 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Development and Evaluation of a Graphic Display System for BWRS.
P. Yarrington. 1982, 10p SAND-82-0166C, CONF-820609-1
Contract AC04-76DP00789
American Nuclear Society annual meeting, Los Angeles, CA, USA, 6 Jun 1982.

The work described involves development and evaluation of a computerized graphics display system (GDS) for assisting BWR operations under off-normal plant conditions. This work is jointly supported by the BWR Owners' Group (BWROG) Control Room Committee and the US Department of Energy LWR Safety Program through Sandia Laboratories. The present evaluation program consists of two phases of testing: a dynamic screening phase and a simulator evaluation phase. In both phases of testing, reactor operators or utility personnel with reactor operating experience, will perform the actual system reviews.

DE82008075 MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Prototype Steam Generator Test at SCTI/ETEC. Acoustic Program Test Plan.
D. A. Greene, A. Thiele, and T. N. Claytor. Oct 81, 22p DOE/SF/70030-T60, XL-791-10141
Contract AT03-76SF70030
Portions of document are illegible.
Available in microfiche only.

This document is an integrated test plan covering programs at General Electric (ARSD), Rockwell International (RI) and Argonne National Laboratory (CT). It provides an overview of the acoustic leak detection test program which will be completed in conjunction with the prototype LMFBR steam generator at the

Energy Technology Engineering Laboratory. The steam generator is installed in the Sodium Components Test Installation (SCTI). Two acoustic detection systems will be used during the test program, a low frequency system developed by GE-ARSD (GAAD system) and a high frequency system developed by RI-AI (HALD system). These systems will be used to acquire data on background noise during the thermal-hydraulic test program. Injection devices were installed during fabrication of the prototype steam generator to provide localized noise sources in the active region of the tube bundle. These injectors will be operated during the steam generator test program, and it will be shown that they are detected by the acoustic systems.

DE82008281 MF **A01**
Gas-Cooled Reactor Associates, La Jolla, CA.
FY 1981 HTGR Program Summary-Level Program Outline (Revision 1/30/81).
1981, 72p DOE/SF/02034-T57
Contract AC03-78SF02034
Available in microfiche only.

The objective of the DOE HTGR Program is the development of technology for the most important HTGR applications. Through this support, DOE seeks to encourage private sector initiatives which will lead to the development of commercially attractive HTGR applications that concurrently support national energy goals. Currently perceived as important to national energy goals are applications that primarily address the process heat market with a view toward reduction of national requirements for oil, natural gas and coal. A high priority during FY 1981, therefore, will be to further identify and define the details of the Technology Program so as to assure that it is both necessary and sufficient to provide the required support. In the establishment of a supportive Technology Program, key elements which will be addressed are as follows: studies will be conducted to further identify and characterize important unique HTGR applications and to evaluate their potential in the context of market opportunities, utility/user interest, and national objectives to develop new energy supply options; based upon the configurations and operating characteristics projected for selected applications, Technology Program requirements must be identified to support development, verification, and ultimately licensing of components and systems comprising the facilities of interest; and in the context of limited resources, sufficient analysis and evaluation must be accomplished so as to prioritize technology elements in accordance with appropriately developed criteria.

DE82008528 PC **A02**/MF **A01**
Gas-Cooled Reactor Associates, La Jolla, CA.
Review of Draft HTGR-SC/C Design and Technology Development Plans.
22 Sep 81, 9p DOE/SF/02034-T65
Contract AC03-78SF02034

GCRA has approached the initial review of the subject plans from the vantage of Utility/User interests in an HTGR-SC/C Lead Project as characterized in the HTGR-SC/C Lead Project Plan. At their current stage of development, the plans are considered to represent the early views of General Atomic Company, acting as a potential NSSS vendor, on the effort necessary to design and license an HTGR-SC/C plant. As such, these plans embody GA's perception of the level of technical development and demonstration needed to support the cost and risk sharing assumptions in the Lead Project Plan. These plans and the plant design which they address will be subjected to a more formal review by other vendor and Utility interests in the course of establishing the Project Decision Package scheduled for June 1982. The culmination of these review activities will be the adoption of this information by all participants as the HTGR-SC/C Program Baseline.

DE82008552 PC **A02**/MF **A01**
Gas-Cooled Reactor Associates, La Jolla, CA.
Overview of the Siting Characteristic of the HTGR Steam Cycle/Cogeneration.
Nov 81, 23p DOE/SF/02034-T56
Contract AC03-78SF02034

This report presents an overview of the siting characteristics of the HTGR-SC/C design and compares them to current NRC limiting criteria for radiological impact considerations. A systems advantage comparison is also made to an equivalent size PWR. Data is presented in summary tabular format that is derived from existing plant designs and published safety and environmental analysis for both the HTGR and the PWR.

DE82014881 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Technical Evaluation Report on the Proposed Design Modifications and Technical Specification Changes on Grid Voltage Degradation for the Millstone Nuclear Power Station, Unit 1.
J. C. Selan. 13 May 82, 12p UCID-19139
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche only after original copies are exhausted.

This report documents the technical evaluation of the proposed design modifications and Technical Specification change for protection of Class 1E equipment from grid voltage degradation for the Millstone Nuclear Power Station, Unit 1. The review criteria are based on several IEEE standards and the Code of Federal Regulations. The evaluation finds that the licensee has not provided sufficient information on the undervoltage protection system to allow a complete evaluation into the adequacy of protecting the Class 1E equipment from sustained voltage degradation.

DE82903576 MF **A01**
Cramer and Lindell Engineers, Inc., Essex, CT.
Application of an Eddy Current Technique to Steam Generator U-Bend Characterization. Final Report.
W. E. Cramer, L. de la Pintiere, S. Narita, and M. J. Bergander. Apr 82, 126p EPRI-NP-2339
Best available copy from document source. Available in microfiche only.

Eddy current nondestructive testing techniques are used widely throughout the utility industry for the early detection of tube damage in critical power plant components such as steam generators. In this project, the application of an eddy current technique for the characterization of U-bend transitions in the first row tubing in Westinghouse 51 Series Steam Generators has been investigated. A method has been developed for detection of the opposite transition in the U-bend and for defining its severity. Investigation included two different types of U-bend transitions. Using the developed eddy current method for U-bend characterization, on-site inspection was performed on all tubes in the first row in four 51 Series steam generators in Power Plant Unit No. 2 and in one 51 Series steam generator in Power Plant Unit No. 1. The advantages and limitations of the developed method as well as the recommendations for further investigations are included.

NUREG/CR-2000-V1-N8 PC **A09**/MF **A01**
Oak Ridge National Lab., TN.
Licensee Event Report (LER) Compilation: For Month of August 1982.
Monthly rept.
Sep 82, 179p ORNL/NSIC-200
See also NUREG/CR-2000-V1-N7.

This monthly report contains Licensee Event Report (LER) operational information that was processed into the LER data file of the Nuclear Safety Information Center (NSIC) during the one month period identified on the cover of this document. The LERs, from which this information is derived, are submitted to the Nuclear Regulatory Commission (NRC) by nuclear power plant licensees in accordance with federal regulations. Procedures for LER reporting are described in detail in NRC Regulatory Guide 1.16 and NUREG-0161, Instructions for Preparation of Data Entry Sheets for Licensee Event Reports. The LER summaries in this report are arranged alphabetically by facility name and then chronologically by event date for each facility. Component, system, and keyword indexes follow the summaries. The components and systems are those identified by the utility when the LER form is initiated; the keywords are assigned by the NSIC staff when the summaries are prepared for computer entry.

18F. Radiation Shielding and Protection

DE82009613 MF **A01**
Brookhaven National Lab., Upton, NY.
Positron Energy-Loss Measurements in Thin Alumina Films.
K. G. Lynn, W. Frieze, and D. A. Fischer. 1982, 3p
BNL-31143, CONF-820434-2
Contract AC02-76CH00016
International conference on positron annihilation, Arlington, TX, USA, 3 Apr 1982, Portions of document are illegible.
Microfiche copies only.

Transmitted-positron energy loss measurements were performed on approximately 100A alumina films with incident positron energies ranging from 0.5 to 3.0 keV. The positrons were electrostatically focussed on the film and the transmitted positrons were energy analyzed using a four-grid retarding field analyzer coupled with a two-stage channel electron multiplier plate connected with a phosphor screen. A strong transmitted elastic peak as well as indications of discrete energy losses were detected in these measurements. The observed discrete loss effects occurred at an average energy of approx. 25 eV and possibly approx. 50 eV. These findings are consistent with reported electron loss peaks due to plasmon excitation in alumina films.

DE82010617 MF **A01**
Brookhaven National Lab., Upton, NY.
Neutron Scattering Experiments on Well-Staged Graphite - FeCl sub 3.
J. D. Axe, C. F. Majkrzak, L. Passell, S. K. Satija, and G. Dresselhaus. 1981, 2p BNL-30702, CONF-810604-8
Contract AC02-76CH00016
15. biennial conference on carbon, Philadelphia, PA, USA, 22 Jun 1981, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This paper reports results of a neutron diffraction study on both the magnetic and the lattice dynamic structure of graphite-FeCl sub 3 . The FeCl sub 3 system was selected for this study because of the interesting magnetic properties previously reported for this system. Of particular interest is the low temperature magnetic phase transition, which has been shown to be stage dependent. Special emphasis was given to the study of the low temperature magnetic state of the Fe exp 3+ spins and to the longitudinal phonon modes for k/ sub z/ axis acoustic branches. All experiments reported here were carried out on a stage 2 sample of graphite-FeCl sub 3 . The sample was prepared by a two-zone vapor growth technique and was characterized by (00l) x-ray and neutron diffraction patterns to be > 95% stage 2, with only minor inclusions of other stages. (ERA citation 07:048615)

DE82012140 MF **A01**
Los Alamos National Lab., NM.
CT Reconstruction from Limited Projection Angles.
K. M. Hanson. 1982, 9p LA-UR-82-740, CONF-820533-1
Contract W-7405-ENG-36
Society of Photo-Optical Instrumentation Engineers meeting, New Orleans, LA, USA, 9 May 1982, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

When the available CT projection data are incomplete, there exists a null space in the space of possible reconstructions about which the data provide no information. Deterministic CT reconstructions are impotent in regard to this null space. Furthermore, it is shown that consistency conditions based on projection moments do not provide the missing projections. When the projection data consist of a set of parallel projections that do not encompass a complete 180 exp 0 rotation, the null space corresponds to a missing sector in the Fourier transform of the original 2-D function. The long-range streak artifacts created by the missing sector can be reduced by attenuating the Fourier transform of the reconstruction smoothly to zero at the sector boundary. It is shown that the Fourier transform of a reconstruction obtained under a maximum entropy constraint is nearly zero in the missing sector. Hence, maximum entropy does not overcome the basic lack of information. It is suggested that some portion of the null space might be filled in by use of a priori knowledge of the type of image expected. (ERA citation 07:045200)

DE82016089 PC **A10**/MF **A01**
Sandia National Labs., Livermore, CA.

Sandia National Laboratories CDC7800 Version of MORSE-SGC.
S. A. Dupree, and R. E. Lighthill. Feb 82, 218p
SAND-80-1337
Contract AC04-76DP00789
Portions of document are illegible.
Microfiche only after original copies are exhausted.

A version of the MORSE-SGC code has been developed for the Sandia National Laboratories' CDC7600 computer. MORSE is a Monte Carlo code designed to solve neutron and gamma-ray transport problems. This report is intended as a guide for the use of this code and includes discussions of source definition, geometry specification, biasing, and detectors. Preparation of input for the code is described in detail, and several example problems are presented. Use of auxiliary codes PICTURE, SCEPLOT, and LAVA is also discussed.

18G. Radioactive Wastes and Fission Products

DE82008953 MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Plant.
Waste-Management Program Technical Progress Report, July-September 1980.
Dec 81, 206p DP-80-125-3
Contract AC09-76SR00001
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This quarterly report provides current information on operations and development programs for the management of radioactive wastes from operation of the Savannah River Plant. The studies on the Defense Waste Processing Facility Environmental Impact Statement, environmental and safety assessments, separation and concentration, waste form development and characterization, process and equipment development, the Defense Waste Processing Facility, transuranic waste, and low-level waste R and D are a part of the Long-Term Waste Management Technology Program. The following studies are reported for the SR Interim Waste Operations Program: surveillance and maintenance, waste concentration, low-level effluent waste, waste tank evaluation, tank replacement/waste transfer, and solid waste storage. Work for the Office of Nuclear Waste Isolation is described. (ERA citation 07:052935)

DE82009181 PC **A16**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Workshop on Seismic Performance of Underground Facilities: Proceedings.
I. W. Marine. Jan 82, 373p DP-1623, CONF-810225-
Contract AC09-76SR00001
Workshop on seismic performance of underground facilities, Augusta, GA, USA, 11 Feb 1981, Portions of document are illegible.
Microfiche only after original copies are exhausted.

A workshop entitled Seismic Performance of Underground Facilities was held in Augusta, GA, February 11-13, 1981. The Workshop was organized and conducted by The Savannah River Laboratory of E.I. du Pont de Nemours and Co. and was sponsored by The Department of Energy and The Office of Nuclear Waste Isolation of Battelle. The objective of the Workshop was to review and assess the state of the science of determining and predicting damage to underground facilities from earthquakes, with particular emphasis on the ultimate goal of developing criteria for siting and design of mined geologic nuclear waste repositories. The Workshop consisted of a day of presentations in the categories of Introduction, Data Collection and Analysis, Modeling, and Design. The second day consisted of assessments of the science by subgroups in the subjects of Seismology; Rock Mechanics and Hydrology; Modeling; Licensing, Siting, and Tectonics; and Design. Most Scientists in attendance believed that enough was known of the subsurface effects of earthquakes to proceed with site selection, design, and licensing of a waste repository. There was, however, recognition of several items of research that would enhance the understanding of the subsurface effects of seismicity. (ERA citation 07:045944)

DE82009267 PC **A03**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Radiogenic Gas Accumulation in TRU Waste Storage Drums.
J. P. Ryan. Jan 82, 37p DP-1604
Contract AC09-76SR00001
Portions of document are illegible.
Microfiche only after original copies are exhausted.

A field experiment was conducted over a four-year time span to determine the effect of high-activity transuranic (TRU) waste on the atmosphere within TRU waste storage drums typical of those generated in Savannah River Plant operation. Routine gas composition analyses showed that a significant amount of hydrogen can accumulate in drums that contain high alpha activity, and that flammable gas mixtures could form in such drums in spite of the radiolytic consumption of oxygen. According to this study, gas pressure accumulation does not pose a threat to the integrity of the TRU waste containers that are now being stored at the Savannah River Plant. Therefore, the 20-year storage criterion is still viable. However, the continued avoidance of a perfectly gas-tight drum seal (e.g., epoxy, metal welding) is recommended. The test drums will continue to be monitored. (ERA citation 07:042508)

DE82009316 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Strontium Leachability of Hydrofracture Grouts for Sludge-Slurries.
E. W. McDaniel, M. T. Morgan, J. G. Moore, H. E. Devaney, and L. R. Dole. Mar 82, 56p ORNL/TM-8198
Contract W-7405-ENG-26
Portions of document are illegible.
Microfiche only after original copies are exhausted.

This report summarizes the results obtained from a series of experiments performed to determine the strontium leachability of cement-based sludge-slurry hydrofracture grouts. These grouts simulate those that will be used to dispose of the radioactive sludges now stored at Oak Ridge National Laboratory. The hydrofracture process has been used at ORNL since 1966 for the routine disposal of intermediate-level waste solutions. In this process, cement and other additives are mixed with a waste stream to form a grout, which is then injected into a shale bed at a pressure sufficient to cause fracture along the horizontal bedding planes. The injected grout soon hardens, fixing the radionuclides between the layers of the massive Conasauga shale formation. A new hydrofracture facility has been constructed to dispose of residual sludges that have accumulated at ORNL from the NaOH neutralization of acid waste solutions. These sludges will be slurried with bentonite and pumped from the 37-year-old Gunite storage tanks to the holding tanks at the new hydrofracture facility. Pumpable grouts will be prepared by mixing the sludges with cement and other additives prior to injection in the shale bed. The specimens used in the tests reported here were prepared within the working boundary conditions of the rheogram for pumpable hydrofracture grouts. The results of applying the modified IAEA dynamic leach tests to hydrofracture grout specimens showed improved leach resistance (by a factor of 3 to 5) as the curing time was increased from 28 to 91 d and a weak trend toward lower leachability as increased amounts of dry solids were added. The Joy-Godbee leach model fit the dynamic leach data successfully in most cases. An apparent diffusion coefficient of 5 x 10 exp -12 cm exp 2 / s and a moving boundary coefficient of 1 x 0 exp -7 s exp -1 were obtained for one of the best grout compositions when leached in distilled water. (ERA citation 07:042557)

DE82009356 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Report of the First Interim Meeting of the Seabed Working Group Engineering Studies Task Group.
D. M. Talbert. Feb 82, 27p SAND-82-0127
Contract AC04-76DP00789
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The first interim meeting of the Engineering Studies Task Group (ESTG) was held at the Delft Soil Mechanics Laboratory, Delft, The Netherlands, on 21-24 September 1981. The main business of the meeting was the development of a network analysis for the ESTG. Significant progress was made; however, substantial further development remains to be accomplished. Other items discussed were (1) progress relevant to engineering studies made in the various national programs since the sixth annual meeting of the Seabed Working Group (SWG) held in Paris, February, 1981; (2) the ESTG Boundary Conditions and Scope of Work as previously defined at the Paris meeting; (3) the Draft II SWG Five-Year Plan; (4) the deep ocean drilling proposal made by the Site Selection Task Group at the Paris meeting and expanded upon at their May, 1981, meeting; and (5) a recent compilation of data from the Nares Abyssal Plain arising from the US Program studies. Finally, consideration was given to a plan for continued work by the ESTG. A brief discussion of the principal items is given. The current state of the network analysis is shown. (ERA citation 07:046002)

DE82011570 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
TRUPACT Transuranic Waste Transportation System.
G. H. Lamoreaux, S. H. Sutherland, L. E. Romesberg, and R. G. Eakes. 1981, 12p SAND-81-2101C, CONF-820303-10
Contract AC04-76DP00789
Waste management conference, Tucson, AZ, USA, 8 Mar 1982.

The Transportation Technology Center at Sandia National Laboratories is responsible for the development of new generation transportation systems to be utilized in the management of defense related CH-TRU waste. The development program places particular emphasis on the compatibility of transportation hardware with both waste generating and receiving facilities. An initial design concept has been completed and scale models are being fabricated and tested. Concurrent structural analysis, thermal analysis, and material test programs are being conducted to support the design effort. This paper presents a summary of the activities involved in the development program and a brief overview of the progress to date. (ERA citation 07:049331)

DE82012134 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Experimental Evaluation of the Differential die-Away Pulsed-Neutron Technique for the Fissile Assay of Hot Irradiated Fuel Waste.
J. T. Caldwell, and W. E. Kunz. 1982, 14p LA-UR-82-788, CONF-820424-5
Contract W-7405-ENG-36
ANS topical meeting on treatment and handling of radioactive wastes, Richland, WA, USA, 19 Apr 1982.

Hot irradiated fuel waste packages containing self neutron sources up to 10 exp 7 n/s may be assayed successfully with a 25-mg exp 239 Pu detection sensitivity using a differential die-away fissile assay system based on a Sandia-designed 14-MeV neutron generator. With a minor design change, our system can accommodate contact gamma dose rates up to 10 exp 4 R/h with no loss of fissile assay sensitivity. (ERA citation 07:042622)

DE82012333 MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
General Safety Assessment Document for Rockwell-Managed Nonreator Nuclear Facilities.
Jun 80, 196p RHO-CD-457
Contract AC06-77RLO1030
Portions of document are illegible.
Available in microfiche only.

This document provides a general assessment of the safety of the nonreactor nuclear facilities located at the Hanford Site which are managed by Rockwell Hanford Operations (Rockwell) for the United States Department of Energy (DOE). Nonreactor nuclear facilities are all structures, related equipment, and areas where activities such as the processing, handling and storage of radioactive materials are conducted. The facilities assessed in this document have been arranged into three categories. Chemical processing facilities; waste management facilities; and other facilities. Each facility has been reviewed to identify the risks associated with its operation, and in each case conclusions have been drawn concerning overall facility safety. Assessments of the consequences of these potential hazards were made in terms of impacts on facilities, personnel, the public and the environment. Key design parameters and operational requirements essential for safety are also provided to support conclusions. In each case the need for additional safety studies and Safety Analysis Reports (SARs) is also de-

termined. On the basis of previously prepared safety assessments and evaluations made in this GSAD it is concluded that the operation of Rockwell-managed nonreactor nuclear facilities can be continued safely without undue risk to property, employees, the public and the environment. Nevertheless, in certain areas, affirmative steps will be taken to achieve full compliance with the safety program requirements of MC 0531 with regards to documented Operational Safety Requirements, comprehensive engineering studies and Safety Analysis Reports. (ERA citation 07:042606)

DE82012542 PC A03/MF A01
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Chemical and Physical Characteristics of Spent Light-Water-Reactor Fuel and a Method for Simulation of a Nonradioactive Analog.
R. E. Woodley, C. N. Wilson, and R. L. Hervig. Jul 81, 42p RHO-BWI-C-114
Contract AC06-77RL01030
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Fuel rods in nuclear reactors must be removed at regular intervals as fissionable material is depleted. The current policy set by the US Government is to isolate these spent fuel rods from the biosphere in mined geologic repositories. Those organizations charged with the duty of safely disposing of this radioactive material must design waste packages based on (1) the properties of the nuclear waste and (2) the properties of the geologic medium (host rock). It is the purpose of this document to contribute to the first issue by describing the physical and chemical characteristics of spent fuel and its Zircaloy cladding. One kilogram of a simulated LWR spent fuel was fabricated for the BWIP by the Transient Performance and Properties Section of the Hanford Engineering Development Laboratory. Following the fabrication of the solid solution component of the simulated spent fuel, it was characterized by several analytical techniques. Minor microscopic chemical inhomogeneities in the simulation were discovered, but the general grain-to-grain homogeneity revealed by electron probe analyses indicates that this material is of the required quality for use in hydrothermal experiments. Further bulk chemical analyses should be performed to resolve the discrepancy between the composition of the starting material and final product. (ERA citation 07:045889)

DE82012590 PC A11/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Strength and Permeability Tests on Ultra-Large Stripa Granite Core.
R. Thorpe, D. J. Watkins, W. E. Ralph, R. Hsu, and S. Flexser. Sep 80, 228p LBL-11203, SAC-31
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche only after original copies are exhausted.

This report presents the results of laboratory tests on a 1 meter diameter by 2 meters high sample of granitic (quartz monzonite) rock from the Stripa mine in Sweden. The tests were designed to study the mechanical and hydraulic properties of the rock. Injection and withdrawal permeability tests were performed at several levels of axial stress using a borehole through the long axis of the core. The sample was pervasively fractured and its behavior under uniaxial compressive stress was very complicated. Its stress-strain behavior at low stresses was generally similar to that of small cores containing single healed fractures. However, this large core failed at a peak stress of 7.55 MPa, much less than the typical strength measured in small cores. The complex failure mechanism included a significant creep component. The sample was highly permeable, with flows-per-unit head ranging from 0.11 to 1.55 cm exp 2 /sec. Initial application of axial load caused a decrease in permeability, but this was followed by rapid increase in conductivity coincident with the failure of the core. The hydraulic regime in the fracture system was too intricate to be satisfactorily modeled by simple analogs based on the observed closure of the principal fractures. The test results contribute to the data base being compiled for the rock mass at the Stripa site, but their proper application will require synthesis of results from several laboratory and in situ test programs. (ERA citation 07:052977)

DE82012591 PC A04/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Ultrasonic and Acoustic Emission Results from the Stripa Heater Experiments. Part I. Cross-Hole Investigation of a Rock Mass Subjected to Heating. Part II. Acoustic Emission Monitoring During Cooldown of the Stripa Heater Experiment.
B. N. P. Paulsson, M. S. King, and R. Rachiele. Dec 80, 65p LBL-10975, SAC-32
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche only after original copies are exhausted.

A cross-hole high-frequency acoustic investigation of a granitic rock mass subjected to sustained heating is reported. Compressional and shear-wave velocity measurements along four different paths between four vertical boreholes were made prior to turning on the heater, during 398 days of heating, and after the heater was turned off. These measurements correlated well with the presence of fracture zones, in which the fractures were closed by thermal expansion of the rock upon heating. When the rock mass cooled, the velocity measurements indicated a greater intensity of fracturing than had existed before heating. Laboratory compressional and shear-wave velocity measurements were also made on intact rock specimens obtained from the site and subjected to axial stress. When used to interpret the increases in velocities measured in the field upon heating the rock mass, these measurements implied increases in horizontal normal stresses to between 30 and 40 MPa. Increases in these magnitudes agree with stress measurements made by the other techniques. The ratio of measured compressional to shear-wave velocity appears to provide a sensitive measure of the fraction of crack porosity containing water or gas. (ERA citation 07:052976)

DE82013007 MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Thermal-Gradient Migration of Brine Inclusions in Salt.
S. K. Yagnik. Feb 82, 10p LBL-14080, CONF-820359-1
Contract AC03-76SF00098
Western regional American Nuclear Society student conference, Corvallis, OR, USA, 28 Mar 1982, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

It has been proposed that the high level nuclear waste be buried deep underground in a suitable geologic formation. Natural salt deposits have been under active consideration as one of the geologic formations where a nuclear waste repository may be built in future. The salt deposits, however, are known to contain a small amount (about 0.5 vol.%) of water in the form of brine inclusions which are dispersed throughout the medium. The temperature gradients imposed by the heat generating nuclear waste will mobilize these brine inclusions. It is important to know the rate and the amount of brine accumulating at the waste packages to properly evaluate the performance of a nuclear waste repository. An extensive experimental investigation of the migration velocities of brine inclusions in synthetic single crystals of NaCl and in polycrystalline natural salt crystals has been conducted. The results show that in a salt repository the brine inclusions within a grain would move with the diffusion controlled velocities. The brine reaching a grain boundary may be swept across, if the thermal gradient is high enough. Grain boundaries in polycrystalline rock salt are apparently quite weak and open up due to drilling the hole for a waste canister and to the thermal stresses which accompany the thermal gradient produced by the heat generating waste. The enhanced porosity allows the water reaching the grain boundary to escape by a vapor transport process.

DE82013288 PC A03/MF A01
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Stability of Ceramic Waste Forms in Potential Repository Environments: A Review.
R. J. Johnston, and R. A. Palmer. 31 Mar 82, 50p DOE/ET/41900-13, ESG-DOE-13364
Contract AC09-79ET41900

Most scenarios for geologic disposal of high-level nuclear waste include the eventual intrusion of groundwater into the repository. Reactions in the system and eventual release of the radionuclides, if any, will be controlled by the chemistry of the groundwater, the surrounding rock, the waste form, and any engineered barrier materials that are present, as well as by the temperature and pressure of the system. This report is a compilation and evaluation of the work completed to date on interactions within the waste-form/host-rock/groundwater system at various points in its lifetime. General results from leaching experiments are presented as a basis for comparison. The factors involved in studying the complete system are discussed so that future research may avoid some of the oversights of past research. Although relatively little hard data on prototype waste-form/repository-system interactions exist at this time, the available data and their implications are discussed. Sorption studies and models for predicting radionuclide migration are also presented, again with a study of the factors involved. (ERA citation 07:042487)

DE82013965 MF A01
Westinghouse Electric Corp., Pittsburgh, PA.
TRU Waste-Acceptance Criteria for the Waste Isolation Plant.
Sep 81, 63p WIPP-DOE-069-Rev.1
Contract AC04-78AL05346
Portions of document are illegible.
Available in microfiche only.

This document is intended to delineate the criteria by which unclassified waste will be accepted for emplacement at the Waste Isolation Pilot Plant (WIPP) in Southeastern New Mexico and describe the bases upon which these criteria were established. These criteria are not intended to be specifications but rather limits that will allow waste generating and shipping sites to develop their own procedures and specifications for preparation of TRU waste for shipment to WIPP. These criteria will also allow waste generating sites to plan future facilities for waste preparation that will produce TRU waste forms that are compatible with WIPP waste emplacement and isolation requirements. These criteria only apply to contact handled (CH) and remote handled (RH) transuranic (TRU) waste forms and are not intended to apply to beta-gamma wastes, spent fuel, high level waste (HLW) or experimental forms of radioactive waste. The technical objectives of this document can be summarized in three areas: (1) to provide waste acceptance criteria for use in the design of the WIPP Project; (2) to document the technical justification for TRU waste acceptance criteria for bedded salt as the host medium; (3) to provide quantitative guidelines, in the form of criteria, that can be used by waste form developers in designing TRU waste processing systems that will produce TRU waste forms acceptable for geologic disposal in bedded salt. These criteria are to be used as a supplement to Title 10 and 49 of the Code of Federal Regulations as applicable to the WIPP Project. All applicable state and federal regulations relating to shipments of radioactive or hazardous materials will apply to shipments to WIPP.

DE82014373 PC A06/MF A01
Argonne National Lab., IL.
Fuel-Cycle Programs. Quarterly Progress Report, January-March 1981.
M. J. Steindler, S. Vogler, and G. F. Vandegrift. Mar 82, 116p ANL-81-35
Contract W-31-109-ENG-38
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A program continues for the development of an interim waste form that can be transported from facilities where waste is generated to terminal waste processing. Measurements of rates of leaching from simulated nuclear waste forms ar continuing. The data suggest that leaching from SRL glasses is inhibited by the formation of a Si/Ca/Fe/Al-rich surface layer. Impact tests of solid alternative waste forms (glass and ceramic) are being performed to assess source terms of airborne release (from particle size distributions) and to assess the increases in source terms of leach rates (from increases in surface area). Logging techniques are being developed to measure the relative amount of residual oil in a depleted oil reservoir. A simple technique for the elution of pore fluid (groundwater) from igneous rocks is described, using a special coreholder, as is the elution of brine (in the same apparatus) from a core of Precambrian granite. Testing and development of equipment for the destructive analysis of full-length irradiated fuel rods from the LWBR is in progress. (ERA citation 07:042478)

DE82014374 PC A06/MF A01
Argonne National Lab., IL.

Fuel-Cycle Programs. Quarterly Progress Report, April-June 1981.
M. J. Steindler, S. Vogler, and G. F. Vandegrift. Mar 82, 110p ANL-81-53
Contract W-31-109-ENG-38
Portions of document are illegible.
Microfiche only after original copies are exhausted.

A program continues for the development of an interim waste form capable of being transported from facilities where waste is generated to terminal waste processing. Measurements of rates of leaching from simulated waste glasses are continuing. Laboratory-scale impact tests of solid alternative waste forms are being performed to assess source terms of airborne release and to assess the increases in source terms of leach rates. A review was made of the methodology under development for the characterization of the impact behavior of brittle materials. Logging techniques are being developed to measure the relative amount of residual oil in a depleted oil reservoir by injecting gamma-active solution into it. Analyses of samples from the Notch Peak (House Range, Utah) intrusive body suggest that groundwater flow was through fractures and not through the rock matrix, indicating that no new processes of migration need be considered in the design of a nuclear waste repository. Testing and development of equipment for the destructive analysis of full-length irradiated fuel rods from the LWBR is in progress. (ERA citation 07:042479)

DE82014916 PC **A04**/MF **A01**
Department of Energy, Washington, DC.
Method for Product Performance Evaluation of Candidate Waste Forms for Immobilization of High-Level Radioactive Wastes. Interface Working Group on High-Level Waste Form Selection Factors.
Mar 82, 53p DOE/TIC-11612

An evaluation method to discriminate among candidate waste forms for immobilizing high-level radioactive wastes for geologic disposal has been developed. The evaluation method provides a means to judge the relative merits of potential waste forms based on quantitative product performance data and to establish a comparative ranking.

DE82015022 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Nondestructive Verification and Assay Systems for Spent Fuels.
D. D. Cobb, J. R. Phillips, G. E. Bosler, G. W. Eccleston, and J. K. Halbig. Apr 82, 43p LA-9041-Vol.1
Contract W-7405-ENG-36
Microfiche only after original copies are exhausted.

This is an interim report of a study concerning the potential application of nondestructive measurements on irradiated light-water-reactor (LWR) fuels at spent-fuel storage facilities. It describes nondestructive measurement techniques and instruments that can provide useful data for more effective in-plant nuclear materials management, better safeguards and criticality safety, and more efficient storage of spent LWR fuel. In particular, several nondestructive measurement devices are already available so that utilities can implement new fuel-management and storage technologies for better use of existing spent-fuel storage capacity. The design of an engineered prototype in-plant spent-fuel measurement system is approx. 80% complete. This system would support improved spent-fuel storage and also efficient fissile recovery if spent-fuel reprocessing becomes a reality.

DE82015211 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Ohio State Briefing Book for Low-Level Radioactive Waste Management.
Apr 81, 274p DOE/ID/01570-T49, SRC-7068-4
Contract AC07-76ID01570
Portions of document are illegible.
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The Ohio State Briefing Book is one of a series of state briefing books on low-level radioactive waste management practices. It has been prepared to assist state and federal agency officials in planning for safe low-level radioactive waste disposal. The report contains a profile of low-level radioactive waste generators in Ohio. The profile is the result of a survey of NRC licensees in Ohio. The briefing book also contains a comprehensive assessment of low-level radioactive waste management issues and concerns as defined by all major interested parties including industry, government, the media, and interest groups. The assessment was developed through personal communications with representatives of interested parties, and through a review of media sources. Lastly, the briefing book provides demographic and socioeconomic data and a discussion of relevant government agencies and activities, all of which may impact waste management practices in Ohio.

DE82015518 PC **A11**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Parametric Studies of Radiological Consequences of Basaltic Volcanism.
S. E. Logan, R. L. Link, H. S. Ng, F. A. Rockenbach, and K. J. Hong. Apr 82, 230p SAND-81-2375
Contract AC04-76DP00789
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The Nevada Nuclear Waste Storage Investigations are studying the possibility of siting a nuclear waste repository in tuff somewhere in the southwest portion of the Nevada Test Site. Recurrence of basaltic volcanism in this region, though of low probability, might threaten the containment and isolation of radioactive waste stored in a repository. This report documents the results of a parametric analysis of radiologic consequences of basaltic volcanism which intercepts a radioactive waste repository. Two repository inventories, one containing unreprocessed spent fuel and the other containing high-level waste from reprocessing, and two eruptions, times 100 years and 10,000 years after repository closure, are considered. The specific site chosen for a hypothetical repository is at Yucca Mountain. Parametric thermal modeling indicates that only extreme and very unlikely cases, such as a very wide dike that continued to flow for 30 days, would cause melting of even a few centimeters of the repository host rock or backfill. The most likely fraction of the inventory to become entrained in magma and transported to the surface is estimated to be 8 x 10 exp -5 of the total inventory. Most of the erupted material does not become airborne but forms a cinder cone, scoria sheet, and lava flows. The doses resulting from the nonairborne material are calculated to produce less than 1000 health effects in 10,000 years.

DE82015624 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Controlled Air and Rotary Kiln Proof-of-Principle Tests.
T. G. Hedahl. May 82, 29p EGG-TF-5866
Contract AC07-76ID01570
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Although the incinerator tests did not represent optimized processing, general system design characteristics were established. The test results indicated that the rotary kiln incinerator would be most applicable in the Transuranic Waste Treatment Facility (TWTF) for the following reasons: (1) The rotary kiln is more capable of achieving near-complete combustion of the combustibles in the waste mixed with a high proportion of metal and noncombustible waste. Complete combustion of the cmbustible waste is preferred in order to reduce waste volume and ensure the production of a stable, immobilized waste form. (2) The rotary kiln processing appears to be more flexible. Kiln rotation rate, kiln incline, and waste feed rate and method are system variables which can be altered to meet the needs of processing variable waste compositions. The advantages of the rotary kiln system allow for a practical concept for processing a majority of the radioactive waste at the INEL. However, further engineering tests must be performed to determine the necessary processing ranges and design information for TWTF waste processing.

DE82015716 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Leach Testing of Waste Forms: Interrelationship of ISO- and MCC-Type Tests.
V. M. Oversby. 14 May 82, 39p UCRL-87621, CONF-820570-1
Contract W-7405-ENG-48
Materials Characterization Center workshop on leaching, Gaithersburg, MD, USA, 19 May 1982.

Leach testing experiments were conducted on SYNROC-D material to examine the parameters which affect leaching results and to measure the activation energy for leaching of elements from SYNROC-D. Measured leach rates were found to be controlled by precipitation of insoluble phases for those tests where the sample surface area to volume of leachant (SA/V) multiplied by leaching time (t) exceeded 0.3 cm exp -1 d for leach tests at 90 exp 0 C. In these cases the apparent activation energy for leaching was approximately 10 kcal/mole based on Na and Si data. For leach tests at 90 exp 0 C with (SA/V)(t) less than 0.2 cm exp -1 d, the activation energy for Na and Si dissolution was 18.5 kcal/mole for sample S29 and 14.5 kcal/mole for sample LS04. These activation energies are in agreement with values reported by Tole and Lasaga (1981) for nepheline dissolution. The effect of sample geometry was investigated by leaching a series of crushed samples of different grain size. The results support the view that geometric surface area should be used in leach rate calculations rather than gas adsorption BET surface area. Comparison of results on S29 leaching of crushed samples and monoliths show that data from MCC-1 and ISO type leach tests may be directly compared when the data are examined at constant (SA/V).

DE82015931 MF **A01**
Los Alamos National Lab., NM.
Waste Management at LAMPF.
J. E. Lambert, and D. L. Grisham. 1982, 5p LA-UR-82-1395, CONF-820609-33
Contract W-7405-ENG-36
American Nuclear Society annual meeting, Los Angeles, CA, USA, 6 Jun 1982, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Future major improvements at the Clinto P. Anderson Meson Physics Facility (LAMPF) will require replacement of many large radioactive components. Proper disposal of the components presents special waste management problems caused by component size, weight, geometry, and activity level. A special, large cask trailer (54 metric tons gross) is being constructed for transporting the material to the disposal site. The cask trailer is designed so that the amount of shielding may be individually tailored to suit the geometry and activity level of eah item transported. Special handling techniques and methods of stabilizing loose contamination are being developed to facilitate transport of large radioactive components across open areas. A special Monitor remote-handling system is being constructed to perform the various preparation and rigging operations. Implementation of this equipment will expedite future improvements at LAMPF with minimum impact and/or interference with other ongoing activities.

DE82015999 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
In-Situ Tuff Water Migration/Heater Experiment: Instrumentation Design and Fielding.
D. R. Waymire, and C. O. Duimstra. Apr 82, 30p SAND-81-1058
Contract AC04-76DP00789
Portions of document are illegible.
Microfiche only after original copies are exhausted.

In conjunction with the Nevada Nuclear Waste Storage Investigation Project, Sandia National Laboratories conducted a Water Migration/Heater Experiment in welded tuff at the Nevada Test Site. The heater and associated instrumetation were operated underground for about 7 months during FY80. The instrumentation measured water depth and alkalinity, temperatures, cavity pressures, relative humidity, in-situ stress changes, and displacement in the drill holes and surrounding rock mass. An on-line, calculator-based data acquisition system controlled the experiment and accumulated 120 channels of data. Most instrumentation operated satisfactorily and almost all was recovered for postmortem examination.

DE82016041 PC **A02**/MF **A01**
Westinghouse Electric Corp., Mercury, NV. Advanced Energy Systems Div.
Commercial Nuclear Waste Research and Development Program. Quarterly Report, January-March 1982.
A. R. Hakl. Apr 82, 21p DOE/NV/10250-2
Contract AC08-82NV10250

The Westinghouse Advanced Energy Systems Division Nevada Operations, under contract to the US Department of Energy, provides trained personnel and services at the E-MAD Facility required for nuclear ma-

terials handling, packaging, data gathering, and other related activities in support of the Commercial Nuclear Waste Research and Development Programs. Support is provided to research programs, including: Waste packaging experiments, spent fuel test - Climax (SFT-C), Hanford Near Surface Test Facility (NSTF), Tests of spent reactor fuel interim handling and storage, tests to assess safety of transport systems for spent reactor fuel and solidified high level nuclear waste, and other special waste package development and handling tests as requested by the DOE. Activities reported have been performed to meet subtask objectives of the Nevada Nuclear Waste Storage Investigations (NNWSI) planning documentation for Fiscal Year 1982: Preliminary facility designs, process flow charts, and recommendations for equipment and services which would be required in a Generic Packaging Facility (GPF) co-located with the proposed Test and Evaluation Facility (TEF); E-MAD facility descriptions, logic diagrams, and process flow charts for E-MAD packaging of nuclear waste for the proposed TEF, if the TEF were not located on the Nevada Test Site; Preliminary cost estimates and schedules for a proposed large scale fuel storage demonstration, as requested by DOE/Headquarters; a remote source integrity check of the Cobalt 60 source; calibration and recertification of the Astro Arc automatic welding system. Installation of illustrated alarm panel for the E-MAD Remote Area Monitor (RAM) system in the E-MAD gatehouse; and installation of the RAM/CAM (Constant Air Monitoring) system computer interface hardware.

DE82903142 MF **A01**
NWT Corp., San Jose, CA.
Application of Ultrafiltration to Radwaste. Final Report.
G. F. Palino, T. J. Liang, W. G. Light, and J. W. Kubarewicz. Apr 82, 139p EPRI-NP-2335
Portions of document are illegible.
Available in microfiche only.

A nominal 2 gpm ultrafiltration (UF) system was installed at the Ginna Nuclear Power Station to evaluate the potential of UF equipment in the pretreatment of PWR liquid radwastes. In addition, an assessment was made of the impact of the UF system on downstream components such as the waste evaporator. The UF system was installed in parallel to an existing cartridge filter and was operated on an alternate basis from July 1979 through February 1981. During this period 1.6 x 10 exp 5 gallons of liquid radwaste was processed. Membrane decontamination factors (DFs) for filterables were near 10 exp 5 while the DFs for most nonfilterable species ranged between 1 and 20. Observed volumetric concentration factors for the UF system ranged between 400 and 2000. Relative to the impact of the UF system on the waste evaporator a review was made of past operational records and an evaluation was made of a number of system parameters with UF or cartridge filtration. A review also was made of radwaste system component and area radiation trends and radwaste system repair, maintenance, and inspection (RMI) activities. Significant reductions were noted in waste evaporator radiation levels and RMI activities with UF, although waste evaporator performance measured in terms of heat transfer coefficient changes, throughput, solid waste generation and chemical and isotopic DFs remained unchanged. A site specific cost-benefit analysis favored slightly the cartridge filtration mode of operation. The application of UF to a dirty waste stream of a BWR using a precoat filter was considered briefly. Although the fixed costs for the UF system were expected to be higher, the operating costs were less due to the projected reduction in radwaste volume generation rate with UF operation. (ERA citation 07:042530)

DE82903191 PC **A05**/MF **A01**
Atomic Energy of Canada Ltd., Pinawa (Manitoba). Whiteshell Nuclear Research Establishment.
Canadian Waste Management Reports Index, August 1981.
A. R. Gibson. 1981, 94p NP-2903191
U.S. Sales Only.

The Canadian Waste Management Reports Index serves as a source for and verification of references on radioactive waste management in Canada. This index supersedes the previous versions. Brief abstracts are included for all the recent reports which have been added. (ERA citation 07:042549)

NUREG/CP-0030 PC **A15**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Proceedings of the Symposium on Unsaturated Flow and Transport Modeling Held at Seattle Washington on March 23-24, 1982,
E. M. Arnold, G. W. Gee, and R. W. Nelson. Aug 82, 344p PNL-SA-10325

The proceedings report the technical papers presented and subsequent discussions held at the Symposium. The symposium was focused on the near-surface disposal of low-level radioactive wastes in the unsaturated zone, being an integral part of a larger study on the state-of-the-art.

NUREG/CR-2889 PC **A05**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
A Technical Description of the NRC Long-Term Whole Rod and Crud Performance Test.
Technical rept. Mar-Sep 82,
Robert E. Einziger, R. L. Fish, and R. L. Knecht. Sep 82, 76p HEDL-TME-82-32

Westinghouse Hanford Company (WHC) and EG&G-Idaho are jointly conducting a long-term low-temperature spent fuel whole rod and crud behavior test to provide the Nuclear Regulatory Commission (NRC) with information to assist in the licensing of light water reactor (LWR) spent fuel dry storage facilities. Readily available fuel rods from an H. B. Robinson (PWR) fuel assembly and a Peach Bottom 2 (BWR) fuel assembly were selected for use in the 50 month test. Both intact and defected rods will be tested in inert and oxidizing atmospheres. A 230C test temperature was selected for the first 10 month run. Both nondestructive and destructive exams are planned to characterize the fuel rod behavior during the five year test. Four interim exams and a final exam will be conducted. Crud spallation behavior will be investigated by sampling the crud particulate from the test capsule at each of the four interim exams and at the end of the test. The background to whole rod testing, description of rod breach mechanisms, along with a detailed description of the test, are presented in this document.

N82-31458/4 PC **A03**/MF **A01**
Luleaa Univ. (Sweden). Div. of Soil Mechanics.
Swelling Pressure of Highly Compacted Bentonite.
R. Pusch. Aug 80, 34p SKBF/KBS-TR-80-13

Highly compacted, dense sodium bentonite is used to isolate metal canisters containing highly radioactivity waste products from the surrounding rock. The relationship between the swelling pressure and bulk density of bentonite was investigated with special reference to the influence of ion exchange and temperature. A new type of oedometer for swelling pressure tests was developed. It was found that there seemed to be unique relationship between the bulk density and the pressure, and that a temperature increase to 70 C reduced the pressure to approximately 50% of the value at 20 C. It was observed that the pore water chemistry was not a determinant of the swelling pressure in the bulk density above 2 t/cu m.

18H. Radioactivity

DE82008220 MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Sparging Tests.
1981, 17p DOE/SF/71032-T60
Contract AT03-76SF71032
Portions of document are illegible.
Available in microfiche only.

There is a need to evaluate the radiological source term to determine radiological consequences for postulated LMFBR core disruptive accidents (CDA's). The source term consists of radioactive materials released in form of gases, vapors, liquids or solids from sodium pools. It has been determined that releases of solid particles from contaminated boiling or bubbling pools of sodium are as important as releases of gaseous species. However, very little work has been conducted to study the phenomenon and the magnitude of the solid particle release rate. The objective of the sparging test is to perform experiments to obtain quantitative data as well as phenomenological details on solid particle release rates from bubbling sodium pools to support modeling developments.

DE82014506 MF **A01**
Sandia National Labs., Albuquerque, NM.
Counting System and Resultant Data from Field Determinations of Radium-226 at Twelve Uranium Mill Tailings Sites.
H. L. Rarrick, D. M. Minnema, and L. W. Brewer. 1982, 17p SAND-81-2645C, CONF-820552-3, IAEA-SM—262/45
Contract AC04-76DP00789
International symposium on management of waste from uranium mining and milling, Albuquerque, NM, USA, 10 May 1982, Portions of document are illegible. Best available copy from document source. Available in microfiche only.

A nuclear counting system has been developed and placed in service to determine the Radium-226 content of soils within and beneath uranium mill tailing piles. Minimum detectable activity is approximately 3 pCi Ra-226/g of soil in a 0.5 mr/hr background with a 3-min count. The counting system consists of a lead shield for holding core barrel samplers, a NaI crystal coupled to a photomultiplier (PM) tube, a preamplifier and amplifier, two single channel analyzers (SCAs), a programmable calculator, and a 500 W portable generator. The counting system, installed in a delivery van, was used to count 2773 samples during 10 months under extreme field conditions. Approximate cost of the system excluding vehicle is $8000 US. Vertical profile holes of the tailing piles exhibited Ra-226 activities from over 2000 pCi/g to 15 pCi/g. Ra-226 contamination levels in the soil beneath the tailings varied from 1000 pCi/g to background.

NUREG/CR-2923 PC **A04**/MF **A01**
Battelle Columbus Labs., OH.
MSPEC Users' Manual,
H. Jordan, P. M. Schumacher, and J. A. Gieseke. Jun 82, 53p BMI-2100

The MSPEC aerosol behavior code for a multiple species, singly contained aerosol is described. The model equation used is presented and the numerical solution technique -- modified finite difference coupled with the GEAR ordinary differential equation solver -- is discussed briefly. A short description of each subroutine is presented. Input required by MSPEC is given in detail, as is the result of a sample run. MSPEC is intended to provide a method for estimating aerosol behavior in a homogeneously mixed nonflowing containment atmosphere. The aerosol particles are assumed to be characterizable by representative particles in each of a finite set of size classes. Each representative particle has the average, time varying characteristics of its size class. Large uncertainty rests with the model employed in determining the shape factors associated with a given size class and composition. This model can, however, be readily modified.

PB83-109512 PC **A04**/MF **A01**
Sveriges Geologiska Undersoekning, Uppsala.
Radon - Geological Aspects of an Environmental Problem: Environmental Radon Investigation in Sweden - Regional Environmental Documentation of Natural Radiation in Sweden,
Gustav Akerblom, and Carole Wilson. 1982, 51p SGU-R-30
Papers Presented at the International Meeting on Radon - Radon Progeny Measurements, Montgomery, Alabama 27-28, 1981.

The report covers all aspects of the work being carried out by the Geological Survey of Sweden in relation to radon and other natural radiation hazards found in residential buildings.

18I. Reactor Engineering and Operation

DE81700070 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Sodium Void Experiment and Analysis on FCA Assembly V-1.
Y. Mimura, N. Hirakawa, Y. Matsuno, T. Yasuno, and N. Mizoo. Sep 80, 37p JAERI-M-9053
In Japanese.
U.S. Sales Only.

As a part of the mock-up experiment for Japan Experimental Fast Reactor (JOYO) in FCA, a sodium void ex-

periment and analysis has been carried out on Assembly V-1. Sodium cans (50.8 x 50.8 x 6.3 mm exp 3) in the core were replaced by the empty cans. Small reactivity change associated with the replacement was measured using the calibrated control rod and large one was measured by the subcritical method. The analysis was performed using one-dimensional calculations mainly with the JAERI-Fast set. In some cases, the ABBN Set was also used. The main results obtained are as follows: (1) radial distribution of the single channel void-effect is nearly flat; (2) single channel and wide region void-effects calculated with the JAERI-FAST set agree fairly well with the experimental ones if the streaming effect is taken into account; and (3) as to axial distribution of the void-effect, agreement between the calculated and experimental values is very poor in the central region. (Atomindex citation 12:625120)

DE82005340 MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Evaluation of LLTR Series II Test A-5 Results.
J. C. Amos, D. E. Knittle, K. Chen, T. K. Odegaard, and T. M. Yang. Jun 81, 259p DOE/SF/70030-T50
Contract AT03-76SF70030
Portions of document are illegible.
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Series II test A-6 employed a DEG tube rupture located 222.9 inches above the bottom of the LLTI shroud at the periphery of the tube bundle. The test yielded a peak pressure at the leak site of 340 psia and peak measured temperatures of 2150 exp 0 F. The initial acoustic pressure spike measured upstream of the RD-1 rupture disc assembly of 295 psia was insufficient to burst the upstream rupture membrane. (The LLTV was supposed to be completely filled with sodium. However, review of test data has indicated that approx. 8 ft exp 3 of gas was present in the upper region of the LLTV at the time of test. The presence of this gas in the test article contributed to the reduction in the magnitude of the acoustic pressure spike.) The acoustic pressure spikes diminished and a gradual system pressure rise controlled by the compression of the cover gas in the surge tank occurred. When the system pressure increased to 340 psia about 6.5 seconds after leak initiation, the upstream rupture disc burst followed by burst of the downstream disc about 54 milliseconds later. (ERA citation 07:046896)

DE82005341 MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Status Report on Defining the Basis for Selection of LFMBR Steam Generator Design Basis Leaks.
J. C. Whipple. Sep 81, 9p DOE/SF/70030-T53
Contract AT03-76SF70030
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The principal objective for the LLTR Series II Program is to define the potential for secondary tube failures to establish a basis for selection of DBL's for large leak events. Data are also being obtained to confirm or modify the TRANSWRAP Code and the more advanced SWAAM Code. This report presents the status of the work being accomplished toward defining the basis for LMFBR SG DBL selection. (ERA citation 07:043615)

DE82005486 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
On-Line Validation of Linear Process Models Using Generalized Likelihood Ratios.
J. L. Tylee. Dec 81, 11p CONF-811206-5
Contract AC07-76ID01570
20. IEEE conference on decision and control, San Diego, CA, USA, 16 Dec 1981.

A real-time method for testing the validity of linear models of nonlinear processes is described and evaluated. Using generalized likelihood ratios, the model dynamics are continually monitored to see if the process has moved far enough away from the nominal linear model operating point to justify generation of a new linear model. The method is demonstrated using a seventh-order model of a natural circulation steam generator. (ERA citation 07:050396)

DE82006747 MF **A01**
Sandia National Labs., Livermore, CA.
In-Core Fuel Freezing and Plugging Experiments: The Tran Series at Sandia National Laboratories.
D. A. McArthur, N. K. Hayden, D. J. Sasmor, S. F. Duliere, and E. Edge. 1982, 11p SAND-82-0124C, CONF-820704-4
Contract AC04-76DP00789
International topical meeting on LMFBR safety, Lyon, France, 18 Jul 1982.
Available in microfiche only.

A series of experiments in the Annular Core Research Reactor (ACRR) on freezing and plugging of molten UO sub 2 in small-diameter channels is described. Parameter ranges covered included fuel temperature 2900 to 3500 exp 0 C, steel temperature 400 to 900 exp 0 C, and driving pressure 10 to 15 bar. A stable UO sub 2 crust and fuel penetration distances of 67 to 87 cm were observed, with plugs at the leading edge of the flow in some cases. New models of the freezing and plugging process are being developed, since existing models are inadequate to describe all the phenomena observed.

DE82007045 PC **A10**/MF **A01**
General Atomic Co., San Diego, CA.
HTGR Plant Technology Program. Semiannual Report, September 30, 1981.
Nov 81, 217p GA-A-16564
Contract AT03-76ET35301
Portions of document are illegible.
Microfiche only after original copies are exhausted.

This document reports the technical accomplishments on the HTGR Plant Technology Program at General Atomic during the second half of FY-81. It covers a period when the design direction of the National HTGR Program is being redirected to support a steam cycle cogeneration plant with a lesser but continuing emphasis on higher-temperature applications. (ERA citation 07:050197)

DE82007184 MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Test Section Design Specification: Sparging Tests.
1981, 10p DOE/SF/71032-T61
Contract AT03-76SF71032
Portions of document are illegible.
Available in microfiche only.

The objective is to provide a test facility for in-sodium simulations of conditions following a major loss-of-coolant accident. These tests are intended to provide information on the carry-over of fuel material from a boiling sodium pool.

DE82007718 MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Nuclear Engineering.
Input Parameters to Codes Which Analyze LMFBR Wire-Wrapped Bundles.
J. T. Hawley, Y. N. Chan, and N. E. Todreas. Dec 80, 77p DOE/ET/37240-T2, COO-2245-17TR-Rev.2
Contract AS02-76ET37240
Portions of document are illegible.
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This report provides a current summary of recommended values of key input parameters required by ENERGY code analysis of LMFBR wire wrapped bundles. This data is based on the interpretation of experimental results from the MIT and other available laboratory programs. (ERA citation 07:046733)

DE82008036 MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Selection of Transition Leak Size for LLTR Series II Test A-4.
J. M. Roberts, and L. M. Quintana. Mar 79, 38p DOE/SF/70030-T55, XL-796-79042
Contract AT03-76SF70030
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The objective of this report is to provide the basis for the selection of this transition leak size for testing in the LLTR. This test, designated as Test A-4, is of particular interest because, of all the larger nonflame-jet-type-leaks, it has the longest dwell time in the vessel before the rupture disc blows, thus terminating the IHTS pressure rise. Its potential for generating secondary leaks is considered high. It is easy to postulate the generation of such a leak starting with small leak wastage and progressing into larger and larger leak sizes by self-wastage and adjacent tube wastage. On the other hand, it is not easy to postulate an instantaneous DEG failure in a properly designed and manufactured steam generator. All small leaks which are not terminated would appear to progress in stages which eventually pass through the transition size before they generate sufficient pressure to burst the rupture disc. For these reasons major emphasis is placed on the transition leak size.

DE82008039 MF **A01**
Gas-Cooled Reactor Associates, La Jolla, CA.
Application of the Lines of Protection Concept to the HTGR-SC/C.
Sep 81, 88p DOE/SF/02034-T50
Contract AC03-78SF02034
Portions of document are illegible.
Available in microfiche only.

This study of the application of the line of protection (LOP) concept to high temperature gas-cooled reactors (HTGRs) was motivated by a desire to develop a simple and straightforward HTGR safety concept that embodies many of the more complicated and seemingly conflicting concepts facing nuclear industry safety today. These concepts include: (1) defense in depth; (2) design basis events; (3) core damage events (degraded cores); (4) probabilistic analysis and risk assessment; (5) numerical safety goals; and (6) plant investment protection. The LOP concept described herein attempts to incorporate many of the important principles of each into a cohesive framework which provides an overall logic, meaning, and direction for conducting HTGR design and research activities.

DE82008043 MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
W-1 SLSF Post-Test Data Analysis. Part 1. Thermal Hydraulic Analysis.
D. D. Knight. Oct 80, 127p DOE/SF/71032-T48
Contract AT03-76SF71032
Best available copy from document source. Available in microfiche only.

Four types of tests were performed: (1) a decay heat transient test, (2) Loss-of-Piping-Integrity (LOPI) tests, (3) Boiling Window Tests (BWT), and (4) a fuel pin dryout and failure test. In addition, preliminary tests were run to check systems performance, instrumentation performance and test section heat balance. The objective of the decay heat test was to determine the decay heat transfer characteristics of fresh fuel pins with subcooled sodium. The objective of the LOPI experiments was to test the thermal behavior of fuel pins with four different fuel conditions subjected to the same transient. The transient was designed to simulate a rapid flow decrease as a result of pipe rupture followed by a reactor scram. The objective of the Boiling Window Tests was to study boiling initiation and progression of boiling within the fuel pin bundle.

DE82008059 MF **A01**
General Electric Co., Sunnyvale, CA. Fast Breeder Reactor Dept.
Fuel-Pin Accident Transients Program, Design Review of TREAT Vessel Assembly.
24 Feb 78, 23p DOE/SF/71032-T59
Contract AT03-76SF71032
Portions of document are illegible.
Available in microfiche only.

The design features of the TREAT Vessel Assembly were reviewed with program participants to coordinate special requirements of organizations and facilities. Consideration was given to design configurations that impacted requirements for assembly, handling, shipping and testing.

DE82008064 PC **A03**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Shutdown Heat Removal: Safety Water Tests.
8 Jul 81, 32p DOE/SF/71032-T47
Contract AT03-76SF71032

This specification establishes the requirements to design the SAFETY WATER TESTS to be constructed in the Hydraulic Test Facility (HTF) at the GE San Jose site. The test is an 1/8th scale model of a large loop type breeder reactor or a 1/14th scale model of a large pool type breeder reactor and uses water as the test

fluid. It simulates a breeder reactor system with a 0.5 MW heated core with an upper and a lower plenum, a primary loop with 300 gpm flow rate and four auxiliary cooling systems (DRACS) that are to be immersed in the upper plenum and connected to the inlet plenum through a check valve.

DE82008224 MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Bundle Duct Interaction Studies for Fuel Assemblies.
H. T. S. Hsia, and S. Kaplan. Jun 81, 35p DOE/SF/71031-T35, XL-898-10344
Contract AT03-76SF71031
Portions of document are illegible.
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It is known that the wire-wrapped rods and duct in an LMFBR are undergoing a gradual structural distortion from the initially uniform geometry under the combined effects of thermal expansion and irradiation induced swelling and creep. These deformations have a significant effect on flow characteristics, thus causing changes in thermal behavior such as cladding temperature and temperature distribution within a bundle. The temperature distribution may further enhance or retard irradiation induced deformation of the bundle. This report summarizes the results of the continuing effort in investigating the bundle-duct interaction, focusing on the need for the large development plant.

DE82008530 MF **A01**
Gas-Cooled Reactor Associates, La Jolla, CA.
Status of the United States National HTGR Program.
1981, 12p CONF-8110127-3
Contract AC03-78SF02034
IAEA meeting on gas-cooled reactors, Minsk, USSR, 12 Oct 1981, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The HTGR continues to appear as an increasingly attractive option for application to US energy markets. To examine that potential, a program is being pursued to examine the various HTGR applications and to provide information to decision-makers in both the public and private sectors. To date, this effort has identified a substantial technical and economic potential for Steam Cycle/Cogeneration applications. Advanced HTGR systems are currently being evaluated to determine their appropriate role and timing. The encouraging results which have been obtained lead to heightened anticipation that a role for the HTGR will be found in the US energy market and that an initiative culminating in a lead project will be evolved in the forseeable future. The US Program can continue to benefit from international cooperative activities to develop the needed technologies. Expansion of these cooperative activities will be actively pursued. (ERA citation 07:046709)

DE82008905 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Gas-Cooled Reactor Programs. Fuel-Management Positioning and Accounting Module: FUELMANG Version V1.11, September 1981.
T. W. Medlin, K. L. Hill, G. L. Johnson, J. E. Jones, and D. R. Vondy. Jan 82, 174p ORNL-5718
Contract W-7405-ENG-26
Portions of document are illegible.
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This report documents the code module FUELMANG for fuel management of a reactor. This code may be used to position fuel during the calculation of a reactor history, maintain a mass balance history of the fuel movement, and calculate the unit fuel cycle component of the electrical generation cost. In addition to handling fixed feed fuel without recycle, provision has been made for fuel recycle with various options applied to the recycled fuel. A continuous fueling option is also available with the code. A major edit produced by the code is a detailed summary of the mass balance history of the reactor and a fuel cost analysis of that mass balance history. This code is incorporated in the system containing the VENTURE diffusion theory neutronics code for routine use. Fuel movement according to prescribed instructions is performed without the access of additional user input data during the calculation of a reactor operating history. Local application has been primarily for analysis of the performance of gas-cooled thermal reactor core concepts. (ERA citation 07:050292)

DE82010836 PC **A13**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Nuclear Engineering.
Transient Effects in Turbulence Modelling.
D. R. Boyle, and M. W. Golay. Jun 80, 288p DOE/ET/37240-83TR
Contract AS02-76ET37240
Portions of document are illegible.
Microfiche only after original copies are exhausted.

Measurements of turbulence field data are reported for recirculating water flows under steady-state and transient flow conditions in an improved 1/15 scale FFTF outlet plenum test-cell. A dual-channel Laser Doppler Anemometer is used, and a unique method for performing transient measurements is developed and analyzed. The experimental behavior is predicted with a modified version of the VARR-II fluid dynamics code, and the suitability of using the steady-state turbulence model closure assumptions for analysis of transient flows is evaluated. A relationship between K-sigma and K-epsilon turbulence models is derived, and the two models are found to be nearly equivalent. (ERA citation 07:043561)

DE82012690 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Technical Evaluation Report on the Proposed Amendment to the Technical Specifications on the Reactor Protection System and the Engineered Safety Features Actuation System for Ft. Calhoun, Unit No. 1.
J. C. Selan. 9 Apr 82, 8p UCID-19136
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche only after original copies are exhausted.

This report documents the technical evaluation of the application to amend the Technical Specifications for the Ft. Calhoun Unit No. 1 Nuclear Generating Plant. The review criteria are based on the Technical Specifications of St. Lucie and Calvert Cliffs, IEEE Standards, Combustion Engineering Standard Technical Specifications, and the Code of Federal Regulations. The evaluation compares the submittal made by the licensee with the NRC staff position and the review criteria and presents the reviewer's conclusion on the acceptability of the application to amend the Technical Specifications.

DE82013479 MF **A01**
Oak Ridge National Lab., TN.
Modeling of a Turbine Flowmeter in Transient Two-Phase Flow.
N. C. J. Chen, and D. K. Felde. 1981, 11p CONF-810477-3
Contract W-7405-ENG-26
12. modeling and simulation conference, Pittsburgh, PA, USA, 30 Apr 1981, Portions of document are illegible.
Microfiche copies only.

A transient turbine meter model by Kamath and Lahey was applied to calculate two-phase mass flux from test data at the Thermal Hydraulic Test Facility (THTF). Comparisons are made with homogeneous models based on measured average density and volumetric flow rate in an effort to determine uncertainites introduced by two-phase flow effects such as slip ratio and void fraction. (ERA citation 07:043604)

DE82013515 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Oak Ridge National Laboratory Research Reactor Experimenters' Guide.
C. D. Cagle. Apr 82, 37p ORNL/TM-8308
Contract W-7405-ENG-26
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The Oak Ridge National Laboratory (ORNL) operates six research reactors dedicated to research and development work as well as radioisotope production. These reactors are used by ORNL and qualified non-ORNL research and development groups. The purpose of this report is to provide information to research personnel concerning the facilities and the ORNL research and services groups available to assist in the design, fabrication, operation, and post-operation examination of irradiation assemblies. Safety and operability reviews and quality assurance requirements are also described.

DE82013544 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
High Flux Isotope Reactor. Quarterly Report, October, November, and December 1981.
B. L. Corbett, and K. H. Poteet. Apr 82, 17p ORNL/TM-8305
Contract W-7405-ENG-26

Routine reactor operation with four end-of-cycle shutdowns and two unscheduled shutdowns resulted in an on-stream time of 90.9% for the quarter. The outer control plates and the inner control cylinder were changed, the removable and semi-permanent reflectors were replaced, and a semiannual core component inspection was made.

DE82014905 PC **A04**/MF **A01**
Argonne National Lab., IL.
Design Guide for Single Circular Cylinder in Turbulent Crossflow.
T. M. Mulcahy. Mar 82, 67p ANL-CT-82-7
Contract W-31-109-ENG-38

A design procedure is proposed for predicting the dynamic structural response of a circular cylinder in turbulent crossflow. The procedure is based on recently obtained data for a stationary, rigid cylinder and on existing information. The procedure is not applicable to conditions where the wake vortex shedding frequency locks into a structural natural frequency. This report is self-contained in that all the information and structural analysis methods employed in the procedure are reviewed and developed. Also, an example is given to illustrate the use of the method for a typical reactor component. The calculated responses are found to be very small.

DE82014950 MF **A01**
Bettis Atomic Power Lab., Pittsburgh, PA.
Preliminary Design and Manufacturing Feasibility Study for a Machined Zircaloy Triangular Pitch Fuel Rod Support System (Grids) (AWBA Development Program).
W. A. Horwood. Jul 81, 75p WAPD-TM-1491
Contract AC11-76PN00014
Best available copy from document source. Available in microfiche only.

General design features and manufacturing operations for a high precision machined Zircaloy fuel rod support grid intended for use in advanced light water prebreeder or breeder reactor designs are described. The grid system consists of a Zircaloy main body with fuel rod and guide tube cells machined using wire EDM, a separate AM-350 stainless steel insert spring which fits into a full length T-slot in each fuel rod cell, and a thin (0.025" or 0.040" thick) wire EDM machined Zircaloy coverplate laser welded to each side of the grid body to retain the insert springs. The fuel rods are placed in a triangular pitch array with a tight rod-to-rod spacing of 0.063 inch nominal. Two dimples are positioned at the mid-thickness of the grid (single level) with a 90 exp 0 included angle. Data is provided on the effectiveness of the manufacturing operations chosen for grid machining and assembly.

DE82015127 PC **A04**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Finite-Element Procedure for Calculating the Three-Dimensional Inelastic Bowing of Fuel Rods (AWBA Development Program).
S. E. Martin. May 82, 73p WAPD-TM-1498
Contract AC11-76PN00014

An incremental finite element procedure is developed for calculating the in-pile lateral bowing of nuclear fuel rods. The fuel rod is modeled as a viscoelastic beam whose material properties are derived as perturbations of the results of an axisymmetric stress analysis of the fuel rod. The effects which are taken into account in calculating the rod's lateral bowing include: (a) lateral, axial, and rotational motions and forces at the rod supports, (b) transverse gradients of temperature, fast-neutron flux, and fissioning rate, and (c) cladding circumferential wall thickness variation. The procedure developed in this report could be used to form the basis for a computer program to calculate the time-dependent bowing as a function of the fuel rod's operational and environmental history.

DE82015499 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.

Light Water Reactor Safety Technology Program. Quarterly Report, October-December 1981.
D. A. Dahlgren. Mar 82, 39p SAND-82-0823
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

The areas of activity during this period are reported: Management Support Program, Fisk Mehods Utilization, Improved Safety Systems, Man-Machine Interface, Safety Data, and Utility Training.

DE82015825 MF **A01**
Northwestern Univ., Evanston, IL.
Convective Boiling Heat Transfer in Narrow Annular Gaps. Progress Report, September 1, 1981-May 15, 1982.
S. G. Bankoff, R. S. Tankin, and T. E. Rehm. May 82, 12p DOE/ER/10998-1
Contract AC02-81ER10998
Portions of document are illegible.
Microfiche copies only.

One of the major problems facing the utility industry in the next decade is the probability of extensive steam generator tube failures in existing pressurized-water nuclear reactor power plants. Failures, as in the recent failure at the Ginna power plant in New York State, are due to combined corrosion and thermal cycling. Alternate dryout and rewetting can occur where the tubes pass through the tube support plates (TSP) or the tubesheet. Hence an understanding of the mechanics of convective boiling in narrow crevices is essential. The present work is designed to contribute to that understanding. Previous work with the existing flow loop focussed on an eccentric annular gap, in which the tube was in line contact with the circular hole in the TSP. Because it is difficult to determine the effect of local crevice width in that geometry, the present work is aimed at concentric annular crevices, using the actual steam generation tubing, over a pressure range up to 100 psi on the secondary side. As a result of experiments over several months, it was determined that some important modifications to the secondary flow loop are needed.

DE82903147 MF **A01**
Fracture Proof Design Corp., St. Louis, MO.
Application of Tearing Modulus Stability Concepts to Nuclear Piping. Final Report.
K. H. Cotter, H. Y. Chang, and A. Zahoor. Feb 82, 117p EPRI-NP-2261
Portions of document are illegible.
Available in microfiche only.

The recently developed tearing modulus stability concept was successfully applied to several boiling water reactor (BWR) and pressurized water reactor (PWR) piping systems. Circumferentially oriented through-the-thickness cracks were postulated at numerous locations in each system. For each location, the simplified tearing stability methods developed in USNRC Report NUREG/CR-0838 were used to determine crack stability. The J-T diagram was used to present the results of the computations. The piping systems considered included Type 304 stainless steel as well as A106 carbon steel materials. These systems were analyzed using the piping analysis computer code MINK. (ERA citation 07:046663)

DE82903568 MF **A01**
Practical Analysis and Computing, Inc., Arvada, CO.
Descriptive Evaluation of RELAP-5.
J. A. Trapp. Apr 82, 55p EPRI-NP-2361
Available in microfiche only.

The basic hydrodynamic model chosen for the RELAP-5 Code development effort has been descriptively evaluated. An evaluation of the detailed technical implementation of the various models is beyond the scope of the present report. Rather, the basic assumptions used to develop the field equations, the major process and constitutive models, and the numerical solution algorithm have been examined. Both the strong areas and the areas needing improvement have been noted.

NUREG/CR-1369-REV-1 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Procedures Evaluation Checklist for Maintenance, Test and Calibration Procedures Used in Nuclear Power Plants.
Technical rept. 31 May 81-31 Jul 82,
R. L. Brune, and M. Weinstein. Sep 82, 26p SAND-80-7054
Prepared in cooperation with HPT, Inc., Thousand Oaks, CA. See also NUREG/CR-1369.

This report describes a checklist to be used by the United States Nuclear Regulatory Commission (NRC) inspectors during their evaluation of maintenance, test, and calibration procedures. The objective of the checklist is to aid inspectors in identifying procedural characteristics that can lead to human performance deficiencies. A companion document, Development of a Checklist for Evaluating Maintenance, Test, and Calibration Procedures Used in Nuclear Power Plants, NUREG/CR-1368, SAND80-7053, describes how the checklist was developed.

NUREG/CR-2606 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Analyses of 1/15 Scale Creare Bypass Transient Experiments.
Technical rept.,
L. N. Kmetyk, L. D. Buxton, and R. K. Cole, Jr. Sep 82, 61p SAND-81-1932

RELAP4 analyses of several 1/15 scale Creare H-series bypass transient experiments have been done to investigate the effect of using different downcomer nodalizations, physical scales, slip models, and vapor fraction donoring methods. Most of the analyses were thermal equilibrium calculations performed with RELAP4/MOD5, but a few such calculations were done with RELAP4/MOD6 and RELAP4/MOD7, which contain improved slip models. In order to estimate the importance of nonequilibrium effects, additional analyses were performed with TRAC-PD2, RELAP5 and the nonequilibrium option of RELAP4/MOD7. The purpose of these studies was to determine whether results from Westinghouse's calculations of the Creare experiments, which were done with a UHI-modified version of SATAN, were sufficient to guarantee SATAN would be 'conservative' with respect to ECC bypass in full-scale plant analyses.

NUREG/CR-2753 PC **A06**/MF **A01**
Oak Ridge National Lab., TN.
Analysis of a Double-Ended Cold-Leg Break Simulation - THTF Test 3.05.5B,
W. G. Craddick, and R. E. Pevey. Sep 82, 111p ORNL-5886
Contract W-7405-eng-26

An experiment was performed in the Oak Ridge National Laboratory Thermal-Hydraulic Test Facility that simulated a double-ended cold-leg break pressurized-water reactor (PWR) accident. Analysis of the experiment revealed that nuclear fuel rods exposed to the same hydrodynamic environment as that which existed in the experiment would have departed from nucleate boiling both earlier and later than the fuel rod simulator (FRS), depending on the size of the gap between the nuclear fuel pellets and cladding and on the initial power of the nuclear fuel rod.

NUREG/CR-2787-V2 PC **A99**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Interim Reliability Evaluation Program: Analysis of the Arkansas Nuclear One - Unit 1 Nuclear Power Plant, Volume 2,
Gregory J. Kalb. Jun 82, 1113p SAND-82-0978-VOL-2
Contract DE-AC04-76DP00789
See also NUREG/CR-2787-V1.

Contents: Systemic event tree analysis; Introduction to the analysis of Ano-1 front-line and support systems; High pressure injection/high pressure recirculation system; Low pressure injection/recirculation system; Core flood system; Reactor building spray system; Emergency feedwater system; Reactor building cooling system; Reactor protection system; Power conversion system; Engineered safeguards actuation system; Service water system; Class IE AC power system; 125 volt DC system; Battery and switchgear emergency cooling system; Emergency feedwater initiation and control system; Human interface system; Sequence quantification, and supporting calculations.

NUREG/CR-2818 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Protective Measures and Regulatory Strategies for Core Melt Accidents.
Contractor rept.
Sep 82, 50p SAND-82-7071
Contract DE-AC04-76DP00789
Also pub. as International Energy Associates Ltd., report no. IEAL-194.

The Nuclear Regulatory Commission (NRC) is considering the promulgation of new regulations concerning core-melt accidents (CMAs). An Advance Notice of Proposed Rulemaking, which addresses both degraded and melted cores, has already been issued. These questions seem to focus on two basic topics: (1) measures to protect against (i.e., prevent or mitigate) CMAs and (2) regulatory strategies for addressing CMAs. This report will provide the NRC with broad overviews of these two topics as a means to address the central issue of this study--the regulatory impact of including CMAs in the regulatory process.

NUREG/CR-2824-V1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Eddy-Current Inspection for Steam Generator Tubing Program Quarterly Progress Report for Period Ending March 31, 1982,
C. V. Dodd, W. E. Deeds, and R. W. McClung. Sep 82, 12p ORNL/TM-8418/V1
Contract W-7405-eng-26
See also NUREG/CR-2305-V4.

Eddy-current methods provide the best in-service inspection of steam generator tubing, but these techniques can produce ambiguity because of the many independent variables that affect the signals. This development program has used mathematical models and has developed or modified computer programs to design optimum probes, instrumentation, and techniques for multifrequency multiproperty examinations. Interactive calculations and experimental measurements have been made with modular eddy-current instrumentation and a minicomputer. These establish the coefficients for the complex equations that define the values of the desired properties (and the attainable accuracy) despite changes in other significant variables.

NUREG/CR-2888 PC **A10**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Operator Action Event Trees for the Zion 1 Pressurized Water Reactor,
Robert G. Brown, James L. VonHerrmann, and James F. Quilliam. Sep 82, 205p EGG-2201
Contract DE-AC07-76IDO1570
Prepared by Wood-Leaver and Associates, Inc.

Operator Action Event Trees for transient and LOCA initiated accident sequences at the Zion 1 PWR have been developed and documented. These trees logically and systematically portray the role of the operator throughout the progression of the accident. The documentation includes a delineation of the required operator response and the key symptoms exhibited by the plant at each state of the tree. These operator action event trees were based on the best-estimate computer analyses under the NRC Severe Accident Sequence Analysis (SASA) Program.

NUREG/CR-2898 PC **A10**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
Reinforced Concrete Containment Safety under Hydrogen Explosion Loading.
Technical rept. Sep 80-Apr 82,
Michael N. Fardis, Alex Nacar, and Michael A. Delichatsios. Sep 82, 222p

The effects of deflagration and detonation of hydrogen on a steel-lined reinforced concrete containment similar to Indian Point Unit 3 are studied. The structural response to a slow deflagration is computed by axisymmetric nonlinear finite element analysis. A static analysis, using average rebar properties and splices stronger than bars, was carried to 170 psig (3.62 x design pressure) giving wall displacements exceeding 20 inches. Introducing natural variability of reinforcing strengths, a second static analysis predicts containment structural failure at 140 psig (2.98 x design pressure). For detonation, a conservative hydrogen accumulation assumption with ignition at floor center and another at containment midheight, on the containment axis, and nonlinear finite element dynamic analyses were used. Neglecting reinforcing material variability, midheight initiation resulted in calculated maximum dynamic strains well below the ultimate rebar strain, while initiation at floor center produced rebar failures around the dome apex. Using reinforcing material variability, all the postulated detonations were well beyond the dynamic containment capacity.

NUREG/CR-2912 PC **A05**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.

Experiment Data Report for Semiscale MOD-2A Feedwater Line Break Experiments (Tests S-SF-1, S-SF-2, and S-SF-3).
Thomas M. O'Connell. Sep 82, 81p EGG-2216
Contract DE-AC07-761DO1570

This report presents recorded test data for Tests S-SF-1, S-SF-2, and S-SF-3 of the Semiscale Mod-2A Steam and Feedwater Line Break Experiment Series. These three tests were used to investigate the thermal-hydraulic phenomena resulting from ruptures in the feedwater line of a pressurized water reactor system, with evaluation focusing on the primary system overpressurization phenomena resulting from the sudden loss of heat sink in the affected steam generator.

NUREG-0580-V11-N9 PC **A04**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
Regulatory Licensing Status Summary Report, Nuclear Power Plants Data for Decisions (Blue Book), August 17 - September 15, 1982.
Sep 82, 73p
See also NUREG-0580-V11-N8.

The report provides a review of the status of the progress of the licensing reviews for all construction permits, operating license, special project and non-power reactor renewals under review, as reported to Congress.

NUREG-0748-V2-N8 PC **A15**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
Operating Reactors Licensing Actions Summary, August 1982.
Sep 82, 342p
See also NUREG-0748-V2-N7.

The Operating Reactors Licensing Actions Summary is designed to provide the management of the Nuclear Regulatory Commission (NRC) with an overview of licensing actions dealing with operating power and non-power reactors.

NUREG-0750-V15-N5 PC **A13**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
Nuclear Regulatory Commission Issuances, May 1982.
May 82, 299p
See also NUREG-0750-V15-N4.

This report includes the issuances received during the specified period from the Commission (CLI), the Atomic Safety and Licensing Appeal Boards (ALAB), the Atomic Safety and Licensing Boards (LBP), the Administrative Law Judge (ALJ), the Directors' Decisions (DD), and the Denials of Petitions For Rulemaking (DPRM).

NUREG-0847-SUP-N1 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Safety Evaluation Report Related to Operation of the Watts Bar Nuclear Plant, Units 1 and 2. Docket Nos. 50-390 and 50-391, Tennessee Valley Authority.
Sep 82, 30p
See also NUREG-0847.

This report supplements the Safety Evaluation Report, NUREG-0847, issued June 1982 by the Office of Nuclear Reactor Regulation of the U.S. Nuclear Regulatory Commission with respect to the application filed by the Tennessee Valley Authority, as applicant and owner, for licenses to operate the Watts Bar Nuclear Plant, Units 1 and 2 (Docket Nos. 50-390 and 50-391). The facility is located in Rhea County, Tennessee, near the Watts Bar Dam on the Tennessee River. This supplement provides recent information regarding resolution of some of the open items identified in the Safety Evaluation Report and discusses recommendations of the Advisory Committee on Reactor Safeguards in its report dated August 16, 1982.

NUREG-0857-SUP-N3 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station, Units 1, 2, and 3. Docket Nos. STN 50-528, STN 50-529, and STN 50-530, Arizona Public Service Company, et al.
Sep 82, 40p
See also NUREG-0857-SUP-N1.

Supplement No. 3 to the Safety Evaluation Report for the application filed by Arizona Public Service Company, et al, for licenses to operate the Palo Verde Nuclear Generating Station, Units 1, 2 and 3 (Docket Nos. STN 50-528/529/530), located in Maricopa County, Arizona has been prepared by the Office of Nuclear Reactor Regulation of the Nuclear Regulatory Commission. The purpose of this supplement is to update the Safety Evaluation Report by providing (1) the evaluation of additional information submitted by the applicants since Supplement No. 2 was issued, and (2) the evaluation of the matters that the staff had under review when Supplement No. 2 was issued.

NUREG-0928 PC **A05**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Safety Evaluation Report Related to the Renewal of the Operating License for the University of Virginia Open-Pool Research Reactor, Docket No. 50-062.
Sep 82, 78p

This Safety Evaluation Report for the application filed by the University of Virginia for a renewal of Operating License R-66 to continue to operate a research reactor has been prepared by the Office of Nuclear Reactor Regulation of the U.S. Nuclear Regulatory Commission. The facility is owned by the University of Virginia and is located on the campus in Charlottesville, Virginia. Based on its technical review, the staff concludes that the reactor facility can continue to be operated by the University without endangering the health and safety of the public or endangering the environment.

N82-32131/6 PC **A08**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Lab. for Thermal Power Engineering.
Post-Scram Liquid Metal Cooled Fast Breeder Reactor (LMFBR) Heat Transport System Dynamics and Steam Generator Control.
J. F. L. M. Brukx. Jun 82, 171p WTHD-146-V-1

Loop type LMFBR heat transport system dynamics after reactor shutdown and during subsequent decay heat removal are considered with emphasis on steam generator dynamics including the development and evaluation of various post-scram steam generator control systems, and natural circulation of the sodium coolant, including the influence of superimposed free convection on forced convection heat transfer and pressure drop. The normal operating and decay heat removal functions of the overall heat transport system are described.

N82-32132/4 PC **A07**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Lab. for Thermal Power Engineering.
Post-Scram Liquid Metal Cooled Fast Breeder Reactor (LMFBR) Heat Transport System Dynamics and Steam Generator Control: Figures.
J. F. L. M. Brukx. Jun 82, 139p WTHD-146-V-2

Dynamic modeling of LMFBR heat transport system is discussed. Uncontrolled transient behavior of individual components and of the integrated heat transport system are considered. For each component, results showing specific dynamic features of the component and/or model capability were generated. Controlled dynamic behavior for alternative steam generator control systems during forced and natural sodium coolant circulation was analyzed. Combined free and forced convection of laminar and turbulent vertical pipe flow of liquid metals was investigated.

18J. Reactor Materials

DE82004499 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Evaluation of TASTEX Task H: Measurement of Plutonium Isotopic Abundances by gamma-Ray Spectrometry.
R. Gunnink, A. L. Prindle, Y. Asakura, J. Masui, and N. Ishiguro. Oct 81, 46p UCRL-52950, ISPO-111
Contract W-7405-ENG-48

This report describes a computer-based gamma spectrometer system that was developed for measuring isotopic and total plutonium concentrations in nitric acid solutions. The system was installed at the Tokai reprocessing plant where it is undergoing testing and evaluation as part of the Tokai Advanced Safeguards Exercise (TASTEX). Objectives of TASTEX Task H, High-Resolution Gamma Spectrometer for Plutonium Isotopic Analysis, the methods and equipment used, the installation and calibration of the system, and the measurements obtained from several reprocessing campaigns are discussed and described. In general, we find that measurements for gamma spectroscopy agree well with those of mass spectrometry and of other chemical analysis. The system measures both freshly processed plutonium from the product accountability tank and aged plutonium solutions from storage tanks. 14 figures, 15 tables.

DE82005380 MF **A01**
General Electric Co., Sunnyvale, CA. Fast Breeder Reactor Dept.
Liquid-Metal Fast-Breeder-Reactor Program: Reference Fuel Studies. Eighth Quarterly Report, August-October 1976.
Nov 76, 80p DOE/SF/78003-T10
Contract AT03-76SF78003
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

In FY-76, Task 3 of Contract E(04-3)-893 consisted of the following programs: fuel rod chemistry and thermodynamics; fuel rod engineering; fuel irradiations testing and analysis; and reference structural materials. Starting in FY-77, the Fuel Rod Engineering Program was reorganized into other existing G.E. programs under the E(04-3)-893 contract. Continuation of the reports on technical progress of this program can be found under 189 No. SG009, Task 3, or 189 No. SG023, Task 11. (ERA citation 07:043437)

DE82005398 PC **A05**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Secure Automated Fabrication: A System Design Description (SDD), Section 1.
G. M. Konze, M. L. Thompson, D. C. Wadekamper, and J. J. Zimmer. 1981, 84p DOE/SF/71031-T29, XL-895-00459-1
Contract AT03-76SF71031

Information is presented concerning the conversion system to convert purified mixed nitrate solution to MO/sub x/ powder; powder preparation and pellet fabrication; sintering and pin loading; assembly fabrication; and scrap recovery.

DE82006731 MF **A01**
Sandia National Labs., Albuquerque, NM.
In-Pile Measurement of the Total Vapor Pressure of Liquid-Oxide Fuels.
K. O. Reil, and W. Breitung. 1982, 7p SAND-82-0089C, CONF-820704-5
Contract AC04-76DP00789
International topical meeting on LMFBR safety, Lyon, France, 18 Jul 1982, Portions of document are illegible.
Available in microfiche only.

Total vapor pressure measurements on liquid oxide fuels were performed in the Annular Core Research Reactor (ACRR). The extensive improvements in experiment design, test preparation and data analysis, achieved since the first in-pile experiments at Sandia, are described. Results are given for the total vapor pressure as a function of internal energy for ultra-pure UO sub 2 . These baseline data are then compared to the total pressure from reactor-typical UO sub 2 , containing known levels of impurities. Fianlly, total vapor pressure data for reactor typical mixed (U, Pu) oxide are presented. (No data are given in this paper).

DE82008040 MF **A01**
Gas-Cooled Reactor Associates, La Jolla, CA.
HTGR Fuel Handling and Storage Design and Cost Report.
Sep 81, 20p DOE/SF/C2034-T48
Contract AC03-78SF02034
Portions of document are illegible.
Available in microfiche only.

From the BOP standpoint for short term fuel storage, it is recommended that the above-the-mat storage concept be adopted in the reference plant design. Location in the lower ARSB or CPS (if GA concurs with rotation of the PCRV) is preferable. From the BOP standpoint for long term fuel storage, it is recommended that the dry storage concept be adopted in the reference plant design.

DE82008288 PC A02/MF A01
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
GE: ARSD Contribution to LIFE4 Documentation.
B. L. Harbourne, and R. J. Hirko. Jun 81, 22p DOE/SF/71031-T36, XL-898-10346
Contract AT03-76SF71031

Enclosed are GE-ARSD contributions to the LIFE4, Rev. O Programmers Manual which is being compiled by W-ARD. Included are descriptions of subroutines CWASTE, FRACT, GOLDN, GAPCON and PLENP, and a description of the cladding creep rupture models. The documentation is based on the working version of the code as it existed at the end of May, and therefore, some minor revisions may be required when the new master version of the code is created.

DE82008647 MF A01
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
GE Post-Test Analysis of SLSF Experiment W-1 Through LOPI-4.
K. E. Gregoire, D. B. Atcheson, and D. D. Knight. Jul 81, 66p DOE/SF/71032-T63
Contract AT03-76SF71032
Available in microfiche only.

SLSF experiment W-1 was designed to investigate fuel pin-to-coolant heat transfer during various LMFBR flow-coastdown events in the burnup interval from 0.0 atom percent to 0.5 atom percent. In the study reported here, data from in-fuel thermocouples and coolant (wire-wrap) thermocouples were evaluated during steady-state and transient operation from the beginning of the experiment through LOPI-4 (Loss-of-Piping-Integrity Transient Number 4). The objective of the data evaluation was to determine how maximum coolant temperatures during successive LOPI transients were affected by burnup. A second objective was to identify the mechanisms responsible for this burnup effect.

DE82008990 PC A02/MF A01
Los Alamos National Lab., NM.
Examination of Fast Reactor Fuels and FBR Analytical Quality Assurance Standards and Methods. Progress Report, July 1-September 30, 1981.
W. J. Maraman. Jan 82, 11p LA-9109-PR
Contract Contact W-7405-ENG-36

This is the twenty-eighth quarterly report on the Examination of Fast Reactor Fuels and Fast Breeder Reactor (FBR) Analytical Quality Assurance and Methods at the Los Alamos National Laboratory. Most of the investigations discussed here are of the continuing type. Results and conclusions described may therefore be changed or augmented as the work progresses. Published reference to results cited in this report should not be made without obtaining explicit permission to do so from the person in charge of the work. (ERA citation 07:053782)

DE82009713 PC A02/MF A01
Los Alamos National Lab., NM.
Direct Reduction of exp 238 PuO sub 2 and exp 239 PuO sub 2 to Metal.
L. J. Mullins, and C. L. Foxx. Feb 82, 19p LA-9073
Contract W-7405-ENG-36

The process for reducing 700 g exp 239 PuO sub 2 to metal is a standard procedure at Los Alamos National Laboratory. This process is based on research for reducing 200 g exp 238 PuO sub 2 to metal. This report describes in detail the experiments and development of the 200-g process. The procedure uses calcium metal as the reducing agent in a molten CaCl sub 2 solvent system. The process to convert impure plutonia to high-purity metal by oxide reduction followed by electrorefining is also described. (ERA citation 07:047421)

DE82012865 PC A02/MF A01
Department of Energy, Washington, DC. Office of Safeguards and Security.
Semi-Annual Report on Strategic Special-Nuclear-Material Inventory Differences.
Jan 82, 24p DOE/DP-0001-9
Microfiche only after original copies are exhausted.

This ninth periodic semiannual report of Inventory Differences (ID) covers the first six months of fiscal year 1981 (October 1, 1980 through March 31, 1981), for the Department of Energy (DOE) and DOE contractor facilities possessing significant quantities of strategic special nuclear material. (ERA citation 07:042609)

DE82013307 PC A03/MF A01
General Atomic Co., San Diego, CA.
Compatibility of Aluminide-Coated Hastelloy X and Inconel 617 in a Simulated Gas-Cooled Reactor Environment.
J. Chin, W. R. Johnson, and K. Chen. Mar 82, 30p GA-A-16668, CONF-820412-3
Contract AT03-76ET35301
Metallurgical coatings and process technology conference, San Diego, CA, USA, 4 Apr 1982.

Commercially prepared aluminide coatings on Hastelloy X and Inconel 617 substrates were exposed to controlled-impurity helium at 850 exp 0 and 950 exp 0 C for 3000 h. Optical and scanning electron (SEM) microscopy, electron microprobe profiles, and SEM X-ray mapping were used to evaluate and compare exposed and unexposed control samples. Four coatings were evaluated: aluminide, aluminide with platinum, aluminide with chromium, and aluminide with rhodium. With extended time at elevated temperature, nickel diffused into the aluminide coatings to form epsilon-phase (Ni sub 3 Al). This diffusion was the primary cause of porosity formation at the aluminide/alloy interface.

DE82013463 MF A01
Oak Ridge National Lab., TN.
Reprocessing in Breeder Fuel Cycles.
W. D. Burch, and W. S. Groenier. 1982, 30p CONF-820420-3
Contract W-7405-ENG-26
International ENS/ANS conference on nuclear energy with emphasis on fuel cycles, Brussels, Belgium, 26 Apr 1982, Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

Over the past decade, the United States has developed plans and carried out programs directed toward the demonstration of breeder fuel reprocessing in connection with the first breeder demonstration reactor. A renewed commitment to moving forward with the construction of the Clinch River Breeder Reactor (CRBR) has been made, with startup anticipated near the end of this decade. While plans for the CRBR and its associated fuel cycle are still being firmed up, the basic research and development programs required to carry out the demonstrations have continued. This paper updates the status of the reprocessing plans and programs. Policies call for breeder recycle to begin in the early to mid-1990's. Contents of this paper are: (1) evolving plans for breeder reprocessing (demonstration reprocessing plant, reprocessing head-end colocated at an existing facility); (2) relationship to LWR reprocessing; (3) integrated equipment test (IET) facility and related hardware development activities (mechanical considerations in shearing and dissolving, remote operations and maintenance demonstration phase of IET, integrated process demonstration phase of IET, separate component development activities); and (4) supporting process R and D. (ERA citation 07:042437)

DE82013541 PC A02/MF A01
Oak Ridge National Lab., TN.
Coprocessing Solvent-Extraction Flowsheet Studies for LWR and FBR Fuels.
E. D. Collins, D. E. Benker, J. E. Bigelow, F. R. Chattin, and L. J. King. 1982, 6p CONF-820420-2
Contract W-7405-ENG-26
International ENS/ANS conference on nuclear energy with emphasis on fuel cycles, Brussels, Belgium, 26 Apr 1982.

Coprocessing solvent extraction studies using irradiated LWR and FBR fuels have indicated the need for an efficient feed clarification. A potentially useful filtration method for fulfilling this need has been demonstrated. Conditions necessary for the satisfactory use of unstabilized hydroxylamine nitrate (HAN) or nitrous acid as the reducing agent for Pu(IV) during reductive stripping operations have been defined. Both partial partitioning and total costripping operations have been demonstrated. In addition, solvent degradation product measurements have been made, and the effect of the presence of DBP during uranium-plutonium stripping operations has been determined. (ERA citation 07:042436)

DE82015038 PC A02/MF A01
Lawrence Livermore National Lab., CA.
SNM Monitor Applications: Diversion Safeguards for Emergency Exits and Detection of Undeclared Feed in Enrichment Plants.
P. E. Fehlau. Apr 82, 23p LA-9310-MS
Contract W-7405-ENG-36
Microfiche only after original copies are exhausted.

A new monitor for special nuclear material (SNM) uses wide plastic scintillators and digital logic to achieve a higher sensitivity for detecting uranium than is found in conventional personnel SNM monitors. With its detectors spaced 2 m apart, the new monitor meets the DOE requirement to detect a 10-g metal exp 235 U sphere of 93% exp 235 U whose total mass is 10.8 g. This capability suits the monitor to scan people who may have to pass quickly through emergency exits. In yet another application, the monitor meets detection goals for detecting freshly separated, natural UF sub 6 that is brought into enrichment plants through personnel portals. To determine the performance of the new monitor for these applications, laboratory source scans and measurements of the growth of uranium daughter activity in freshly separated UF sub 6 were used.

DE82015297 PC A07/MF A01
Hanford Engineering Development Lab., Richland, WA.
Reactivity Analysis of Core Distortion Effects in the FFTF.
B. J. Knutson. 1982, 128p HEDL-7100
Contract AC06-76FF02170
Thesis.

An improved technique for evaluating core distortion reactivity effects was developed using reactivity analyses of two core geometry models (R-Z and HEX). This technique is incorporated into a new processor code called CORDIS. The advantages of this technique over existing reactivity models are that is preserves core heterogeneity, provides a control rod insertion effect model, uses row-dependent axial shape functions, and provides a flexible and cost efficient core distortion reactivity analysis method.

DE82015097 PC A02/MF A01
Atomics International Div., Golden, CO. Rocky Flats Plant.
Recovery of Uranium from Mixed Plutonium-Uranium Residues by an Extraction Chromatography Process.
L. L. Martella, and J. D. Navratil. 15 May 82, 16p RFP-3289
Contract AC04-76DP03533

An extraction chromatographic process has been developed for recovering uranium from uranium-plutonium residues. The process utilizes a column of amberlite XAD-4 resin impregnated with tributyl phosphate to selectively sorb uranium from a 5 M HNO sub 3 solution containing U(VI) and Pu(III). During the eight demonstration runs, the average uranium processing was 69 mg U/ml resin. The retention of plutonium from the mixed uranium-plutonium solution was less than 0.06 g Pu/l resin, which met uranium product purity requirements of $>$ 0.5 wt % plutonium.

DE82016134 PC A02/MF A01
Lawrence Livermore National Lab., CA.
Lasers in Chemical Processing.
J. I. Davis. 15 Apr 82, 25p UCRL-53276
Contract W-7405-ENG-48
Microfiche only after original copies are exhausted.

The high cost of laser energy is the crucial issue in any potential laser-processing application. It is expensive relative to other forms of energy and to most bulk chemicals. We show those factors that have previously frustrated attempts to find commercially viable laser-induced processes for the production of materials. Having identified the general criteria to be satisfied by an economically successful laser process and shown how these imply the laser-system requirements, we present a status report on the uranium laser isotope separation (LIS) program at the Lawrence Livermore National Laboratory.

DE82902874 MF A01
Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil).
Survey on Fuel-Pellet Cracking and Healing Phenomena in Reactor Operation.
S. C. S. Faya. Oct 81, 21p IPEN-Inf-9
Portions of document are illegible.
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In normal reactor operation, oxide fuel pellets will crack. The majority of the pellet segments will lie against the cladding. When temperature in the central region of the fuel during irradiation is raised to the plastic region, crack healing occurs. The repetition of

cracking-healing-cracking sequence resulting from repeated power cycle has a significant effect on fuel relocation. The fuel pellet relocation must be known since it effects the cladding life time. This work describes the fuel pellet cracking and healing phenomena in reactor operation and also discusses the pertinent method of analysis. (ERA citation 07:043529)

DE82903188 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Pinawa (Manitoba). Whiteshell Nuclear Research Establishment.
Canadian Safeguards Program.
C. W. Zarecki, and R. M. Smith. Dec 81, 29p AECL-7084
U.S. Sales Only.

In support of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) Canada provides technical support to the International Atomic Energy Agency (IAEA) for the development of safeguards schemes, equipment, and techniques relevant to Canadian designed and built nuclear facilities. This paper describes the Canadian program, including: the philosophy and method of development of CANDU safeguards systems; the unique equipment developed for these systems; provision of technical experts (on a cost-free basis) to the IAEA; IAEA training programs; liaison with other technical organizations; and the continuing research and development. Also discussed are plans for implementation of safeguards systems at the various nuclear facilities, and the anticipated future direction of the safeguards program. (ERA citation 07:042607)

NUREG/CR-2397 PC **E06**/MF **A01**
Oak Ridge National Lab., TN.
Fuel Inventory and Afterheat Power Studies of Uranium-Fueled Pressurized Water Reactor Fuel Assemblies Using the SAS2 and ORIGEN-S Modules of Scale with an ENDF/B-V Updated Cross Section Library.
J. C. Ryman, O. W. Hermann, C. C. Webster, and C. V. Parks. Sep 82, 140p ORNL/CSD-90
Contract W-7405-eng-26

The SAS2 control module and ORIGEN-S code of the SCALE code system have been used with the standard ORIGEN-S data libraries and the SCALE 27-group ENDF/B-V cross-section library to predict afterheat power and fuel inventories in uranium-fueled pressurized water reactor (PWR) fuel as semblies. Based on present comparisons with measured data and on previous experience, it is concluded that this combination of codes and data bases is properly qualified for the calculation of afterheat power in uranium-fueled PWR fuel assemblies. The prediction of fission product fuel inventory data for fuel samples from three PWR fuel assemblies appears to be adequate, but the prediction of actinide inventory data is seen to be quite conservative with respect to measured data. Additional investigation of the differences between calculated and measured inventory parameters, improvements in the SAS2 cross section treatment, and acquisition of additional experimental data appear to be needed to qualify the SAS2, ORIGEN-S, and data base combination for uranium-fueled PWR fuel inventory calculations.

NUREG/CR-2404 PC **A06**/MF **A01**
Lawrence Livermore National Lab., CA.
Anlayzing Safeguards Alarms and Response Decisions,
R. A. Al-Ayat, B. R. Judd, and R. K. McCord. Jan 82, 115p UCRL-53034

This report describes a quantitative model designed to help the Nuclear Regulatory Commission (NRC) and its licensees evaluate and respond to alarms indicating that special nuclear material (SNM) may be missing. The model is called the Alarm/Response (A/R) Model. The report demonstrates three principal uses of the A/R Model. The first is determining the most likely cause of an alarm--theft, hoax, or error. The second is evaluating alternative responses to alarms. Possible responses include conducting investigations, initiating measures to recover stolen SNM, and replying to extortion threats from individuals claiming to possess SNM. For each possible alarm, the model identifies the best response, which can be used to develop contingency plans that the licensee and the NRC can carry out. The third use is to assist the NRC in setting performance standards, especially detection time requirements. In this application, the model helps to determine the value of more timely alarms produced by licensee safeguards systems. All three uses are demonstrated with hypothetical examples.

NUREG/CR-2791 PC **A11**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Methodology for Evaluation of Insulation Debris Effects: Containment Emergency Sump Performance, Unresolved Safety Issue A-43.
Technical rept.,
J. Wysocki, and R. Kolbe. Sep 82, 232p SAND-82-7067
Prepared by Burns and Roe, Inc., Woodbury, NY.

The postulated failure of high energy piping within a light water reactor containment has raised safety questions related to the generation of insulation debris, the migration of such debris to the containment emergency sump screens and the potential for severe screen blockages. High, or total, screen blockages could result in impairment of the long-term RHR recirculation systems. Debris considerations are an integral part of the Unresolved Safety Issue A-43, 'Containment Emergency Sump Performance.' This report develops calculational methods and debris transport models which can be used for estimating the quantities of debris that might be generated by a LOCA, the transport of such debris, methods for estimating screen blockages and attendant pressure losses. Conservative assumptions are employed and the calculations are shown to be plant specific since the types and quantities of insulation, equipment location, and break locations establish initiating events. Plant layout and sump location, which determine migration paths, are also important. Calculational procedures for estimating break jet impingement effects and blocked screen pressure losses are included. Five operating plants which were analyzed using this debris evaluation methodology are given in the Appendices. The calculation clearly illustrate plant dependency.

NUREG/CR-2820 PC **A06**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Resolution of Shipper-Receiver Differences,
J. W. Johnston, R. J. Brouns, and K. B. Stewart. Sep 82, 116p

This report describes statistical procedures for resolving significant shipper-receiver differences (SRD's) for nuclear material transfers and calculating the best estimate of the true amount of special nuclear material transferred. The resolution of an SRD should generally be accomplished by identifying and removing its causes. Physical and statistical methods and logical stepwise procedures for investigating an SRD under various circumstances are recommended in this report. It is concluded that the best estimates of the true quantities of special nuclear material in a transaction are obtained by calculating the inverse variance-weighted values of the net weights, element fractions, and isotope fractions using the measurement results from the shipper, receiver, and referee laboratory, if any, that are accepted as the best available data.

NUREG/CR-2873-V1 PC **A14**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Nuclear Fuel Cycle Risk Assessment: Descriptions of Representative Non-Reactor Facilities.
Technical rept. 1 Jun 81-30 Jul 82,
K. J. Schneider, W. E. Bickford, P. M. Daling, C. A. Geffen, and T. B. Powers. Jul 82, 308p PNL-4306-VOL-1

The Nuclear Fuel Cycle Risk Assessment Program was initiated to (1) determine the types of risk that dominate the nuclear fuel cycle; (2) develop and apply risk assessment methods and associated computer codes; (3) provide insights for using risk assessment in licensing and regulatory decisionmaking; (4) determine the sources of major contributors to the risk; (5) develop in-house expertise in the application of risk assessment methods and computer codes for use in the regulatory process; and (6) respond to criticism that non-reactor fuel cycle risks have not been adequately considered in evaluating the potential risk to the public from nuclear power generation.

NUREG/CR-2873-V2 PC **A16**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Nuclear Fuel Cycle Risk Assessment: Descriptions of Representative Non-Reactor Facilities, Sections 15-19.
Technical rept. 1 Jun 81-30 Jul 82,
K. J. Schneider, W. E. Bickford, P. M. Daling, C. A. Geffen, and T. B. Powers. Sep 82, 361p PNL-4306

This report, the first from the NRC's Fuel Cycle Risk Assessment Program, defines and describes fuel cycle elements that are being considered in the program. One type of facility (and in some cases two) is described that is representative of each non-reactor element of the fuel cycle. The descriptions are based on real industrial-scale facilities that are current state-of-the-art, or on conceptual facilities where none now exist. The fuel cycles considered in this report are for Light Water Reactors with once-through flow of spent fuel, and with plutonium and uranium recycle. Representative facilities for the following fuel cycle elements are described for uranium (or uranium plus plutonium where appropriate): mining, milling, conversion, enrichment, fuel fabrication, mixed-oxide fuel refabrication, fuel reprocessing, spent fuel storage, high-level waste storage, transuranic waste storage, spent fuel and high-level and transuranic waste disposal, low-level and intermediate-level waste disposal, and transportation. For each representative facility the description includes: mainline process, effluent processing and waste management, facility and hardware description, safety-related information and potential alternative concepts for that fuel cycle element.

NUREG/CR-2922 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Comparison of Quick Predictions with Results of Selected, Recent Aerosol Behavior Experiments.
Topical rept.,
Hans Jordan, Phil M. Schumacher, and James A. Gieseke. Sep 82, 39p BMI-2099

A detailed comparison of QUICK aerosol behavior code predictions with four representative experiments (AB-1, AB-3, NSPP-104, NSPP-203) is presented. It is shown that the three sodium fire experiments of this set can be used to evaluate and confirm values of the two aerosol particle shape factors for these systems (Chi = 1.3, gamma = 5.0). In addition, it is shown that uncertainty in prediction due to uncertainty in the two shape factors is not augmented in translation from experimental to full scale. While the single uranium experiment suggests the doublet Chi = 3.0, gamma = 15.0, these values are more equivocal since for this system wall plate-out is a significant factor. Large uncertainty in plate-out data resulted in concomitant uncertainty in the fitted values of the shape factors.

PB83-112300 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC.
Accountability Tank Volume Calibration Data.
Technical note,
Frank E. Jones, John F. Houser, and Randall M. Schoonover. Aug 82, 16p NBS-TN-1158
Sponsored in part by Nuclear Regulatory Commission, Washington, DC.

This paper presents the very precise data from the volume calibration of a nuclear materials input accountability tank and briefly describes the treatment of the data. The calibration system involves the use of volumetric test measures for dispensing known increments of the calibration fluid (water) into the tank, and a null-operated quartz bourdon-type differential pressure gage for measuring the differential pressure between the bottom of the bubble on the tip of a bubbler tube near the bottom of the tank and a port in the top of the tank. The tank is essentially a right circular cylinder with a capacity of approximately 13,600 L (3,600 gal). The height is approximately 3.4 m (11 ft) and the diameter is approximately 2.4 m (8 ft). The water volume and the differential pressure were adjusted to correspond to the reference temperature, 25.00C.

18K. Reactor Physics

DE82012729 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Neutron- and gamma-Ray Spectrum Measurements at the Los Alamos Critical Assembly - SHEBA.
J. H. Thorngate, D. W. Rueppel, and R. V. Griffith. 12 Aug 81, 6p UCRL-86570, CONF-811243-1
Contract W-7405-ENG-48
American Nuclear Society meeting, San Francisco, CA, USA, 4 Dec 1981.

In the summer of 1980, SHEBA, a critical assembly intended as a facility for evaluation of criticality monitors, was completed at the Los Alamos National Laboratory. The energy dependent response of criticality monitors affects how they respond to radiation fields.

Since these fields will be affected significantly by local shielding, it was important to have data on the neutron and gamma ray spectra from the bare assembly, as well as transmitted through shields (13.3 cm thick steel and 40 cm thick concrete) used to modify the neutron spectrum. The measurements were made at 5 m, 14 m, and 69 m from the assembly with and without the steel or concrete shields between the assembly and the detectors. Gamma-ray spectra were measured up to 10 MeV with a 2" x 2" NaI(Tl) detector. (ERA citation 07:046876)

18L. Reactors (Power)

DE82008217 MF **A01**
Gas-Cooled Reactor Associates, La Jolla, CA.
HTGR Molten Salt Sensible Energy Transmission and Storage System Design and Costs.
Sep 81, 128p DOE/SF/02034-T73
Contract AC03-78SF02034
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

This report, which was prepared for Gas-Cooled Reactor Associates by United Engineers and Constructors under Contract No. GCRA/UE and C 81-203, presents the design and cost for a molten salt Sensible Energy Transmission and Storage (SETS) System. Although the reference system for this study is sized to be compatible with an 1170 MW(t) HTGR Nuclear Heat Source, the results and conclusions should be generally applicable to most large scale molten salt energy transmission system applications. A preliminary conceptual design is presented and alternative configurations are discussed. The sensitivity of system costs to variations in important system parameters are also presented. Costs for a reference case conceptual design are reported in constant 1980 dollars and inflated 1995 dollars.

DE82008262 MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
SCTI Chemical Leak Detection Test Plan.
12 Oct 81, 11p DOE/SF/70030-T63, XL-791-10148
Contract AT03-76SF70030
Portions of document are illegible.
Available in microfiche only.

Tests will be conducted on the CRBRP prototype steam generator at SCTI to determine the effects of steam generator geometry on the response of the CRBRP chemical leak detection system to small water-to-sodium leaks in various regions of the steam generator. Specifically, small injections of hydrogen gas (simulating water leaks) will be made near the two tubesheets, and the effective transport times to the main stream exit and vent line hydrogen meters will be measured. The magnitude and time characteristics of the meters' response will also be measured. This information will be used by the Small Leak Protection Base Program (SG027) for improved predictions of meter response times and leak detection sensitivity.

18N. Snap Technology

DE82009066 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Environmental and Radiological Safety Studies: Interaction of exp 238 PuO sub 2 Heat Sources with Terrestrial and Aquatic Environments. Progress Report, September 26-December 25, 1981.
G. M. Matlack, and J. H. Patterson. Feb 82, 5p LA-9248-PR
Contract W-7405-ENG-36

Although existing radioisotope thermoelectric generator designs have proved more than adequately safe, more information is continually sought about the heat sources to improve their safety. The work here includes studies of the effects on the heat sources of terrestrial and aquatic environments and also of the effect of the heat sources on various simulated environments. This progress report presents recent data from environmental chamber and aquatic experiments and gives the present status of the experiments. (ERA citation 07:042678)

DE82012448 MF **A01**
Mound Facility, Miamisburg, OH.
Testing and Evaluation of Doubly Impacted Simulant-Fueled Milliwatt Generator Heat Sources.
P. E. Teaney, W. B. Cartmill, and R. L. Wise. 9 Apr 82, 110p MLM-MU-82-64-0001
Contract AC04-76DP00053
Best available copy from document source. Available in microfiche only.

As part of the Milliwatt Generator (MWG) Program, 12 simulant-fueled heat sources were fabricated double impact tested, and evaluated at Mound. Ten assemblies were tested at approx. 80 m/sec, and two were tested at approx. 105 m/sec. None of the strength members were breached; therefore, no fuel would have been released as a result of double impacts at the velocities and orientations tested at 450 exp 0 C. There was little difference in results for duplicate tests conducted approx. 80 and approx. 105 m/sec. Ten units contained liners that were embrittled prior to testing. This resulted in cracks in some of the liner that would not have occurred in normally fueled heat sources. (ERA citation 07:046072)

19.

ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A119 397/8 PC **A03**/MF **A01**
Naval Surface Weapons Center, Silver Spring, MD.
Analysis Methods for Explosive Materials. I. Polynitro Compounds.
Final rept.,
Eleanore G. Kayser. 3 Mar 82, 29p NSWC/TR-81-123, SBI-AD-F500 059

A high pressure liquid chromatography method was developed for rapid and quantitative chemical analysis of the following thermally stable explosive materials: DATB, DINA, DIPAM, DNT, DODECA, HNAB, HNBiB, HMX, HNBP, HNS, NONA, ONT, PA, PETN, PYX, RDX, TATB, TETRYL, TNA, TNB, TNN, TNS, TNT, and TPT (see glossary). Additional chemical characterization of the above materials was carried out by Nuclear Magnetic Resonance Spectroscopy and by Thin Layer Chromatography. Dimethylsulfoxide was used as the common solvent for all the compounds in this investigation.

AD-A119 403/4 PC **A04**/MF **A01**
Army Armament Research and Development Command, Dover, NJ. Large Caliber Weapon Systems Lab.
A Comparative Study of Very High Burning Rate Materials - HIVELITE Compositions 300511 and 300435.
Technical rept.,
L. Avrami, R. Velicky, D. Anderson, and D. Downs. Aug 82, 54p ARLCD-TR-82015, SBI-AD-E400 886
Contract MIPR-N60921-81-RD015
Technical monitor: M. Buckley.

A series of safety and characterization tests were performed on a very high burning rate (VHBR) HIVELITE 300511 composition (Teledyne McCormick Selph product) in order to provide sufficient data so that a judgment can be made to qualify the material for in-service use. This composition is claimed to be less sensitive to electrostatics than HIVELITE 300435, a similar composition. The results of HIVELITE 300511 are compared to those for HIVELITE 300435. The range of tests include impact sensitivity, electrostatic sensitivity, friction sensitivity, autoignition, explosion temperature, coefficient of thermal expansion, effect of moisture, growth effects, burn rate tests and closed bomb results. Similar results were obtained with perforated and solid pellets in the modified version of the TMcS standard primer acceptance test to determine the burn rate measurement in open air. However, different results were obtained with larger diameters of solid pellets. The burning progression rates reduced drastically for solid pellets that were coated with hot black asphalt paint to inhibit the surface burning. A significant difference was also noted in the closed bomb testing when compared to the TMcS data. On an overall basis, HIVELITE 300511 is not as sensitive to impact, friction, and electrostatics as HIVELITE 300435. Although the sensitivity to electrostatics has been reduced by a factor of almost 10 for HIVELITE 300511, the material still must be handled as a primary explosive. Sufficient data has been obtained to evaluate HIVELITE 300511 for interim qualification for in-service use.

AD-A119 554/4 PC **A02**/MF **A01**
Army Test and Evaluation Command, Aberdeen Proving Ground, MD.
Projectile Velocity Measurements.
Final rept. on test operations procedure.
21 Sep 82, 25p Rept no. TOP-4-2-805
Supersedes rept. no. TOP-4-2-805 dated 23 Apr 79, AD-A069 005.

This report describes methods for measuring projectile velocity, including time of flight distance measurements, and equipment. The study covers magnetization of projectiles and polarization of coils. Procedures are described for translating measured velocity to muzzle or striking velocity.

AD-A119 646/8 PC **A03**/MF **A01**
Army Missile Command, Redstone Arsenal, AL. Propulsion Directorate.
Design of Solid Propellant Grains Using the Hewlett-Packard 41C Calculator.
Technical rept.,
James C. Hodges, Jr. Mar 82, 37p DRSMI/TR-RK-82-3, SBI-AD-E950 284

This report describes the solution of a typical solid propellant grain design requirement using the Hewlett-Packard 41C hand held calculator and a program for the solution of Wagon Wheel, Modified Wagon Wheel and Star Grain designs. A grain design for an experimental rocket, PLUME is given. The HP41C program is given in Appendix A. (Author)

AD-A119 676/5 PC **A03**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Deceleration of Projectiles in Snow.
Donald G. Albert, and Paul W. Richmond, III. Aug 82, 36p Rept no. CRREL-82-20

Instrumented M374 projectiles were launched into snow, nylon, and Styrofoam targets using a 10.7-m radius centrifuge. For snow of 410-kg/cu m 3 density, the 3.1-kg test projectile experienced decelerations of approximately 220, 400, and 550 m/sq s (at a depth of 0.1 m) for initial impact velocities of 15,30 and 46 m/s respectively. These values disagree with values predicted from a simple hydrodynamic drag force approximation. The decelerations measured for snow targets were always greater than those measured for nylon shaving targets (of density 120 kg/cu m) indicating that this material is not a good analog for snow of the density used in these tests. (Author)

DE82010357 MF **A01**
Sandia National Labs., Albuquerque, NM.
Simulation of Powder-Decoupling Phenomena in Electro-Explosive Devices by Thermomechanical Analysis (TMA).
T. M. Massis, P. K. Morenus, and B. R. Steele. 1982, 17p SAND-82-0064C, CONF-820518-1
Contract AC04-76DP00789
Joint symposium on compatability of plastics and other materials with explosives, Phoenix, AZ, USA, 30 May 1982, Portions of document are illegible.
Available in microfiche only.

A thermomechanical analysis (TMA) technique has been developed to simulate the decoupling or movement of a pyrotechnic away from the bridgewire in a loaded actuator configuration. By applying a force on the TMA probe assembly resting against the pressed pyrotechnic in an epoxy charge holder, the pyrotechnic, TiH. sub 65 /KClO sub 4 , was observed to move or slip in relation to the stationary charge holder material when thermally cycled from -50 exp 0 C to +150 exp 0 C. A mismatch of greater than two to one was ob-

served in the expansion coefficients of the TIH. sub 65 /KC10 sub 4 and charge holder materials. The TMA technique simulated the mechanical shock forces and thermal cycle applied to the actuator during component environmental testing. Such testing had resulted in movement of the pyrotechnic material away from the bridgewire. A design change has been incorporated in the actuator to alleviate this problem by using a one-way washer or spring to immobilize the powder change. The TMA technique has been used evaluate the design changes. Repeated thermal cycles on the TMA of components incorporating one-way washers have shown no movement of the pressed TIH. sub 65 / KC10 sub 4 in relation to the charge holder. Without the washer, pellet slippage was observed during the first cooling cycle. (ERA citation 07:044603)

DE82012694 PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Electrothermal Response Testing: A Component Development Tool.
A. C. Munger, and J. M. Powers. 16 Apr 82, 14p
MLM-2900
Contract AC04-76DP00053

Electrothermal response testing is a technique for uncovering flaws in component design or manufacturing procedures that no other NDT test can detect. Computer technology, now enabling rapid calculation of thermal quantities, has been added to the test since the technique of transient pulse testing was first developed in the early 1960's. The test measures changes to the environment of a component bridgewire induced by loading the unit or by some sort of environmental exposure. Use of the testing technique has uncovered component flaws that x-ray, resistance testing, or visual inspection have not detected. Although the test does not predict component failure, it does indicate the probability of failure or unwanted conditions, and has become an integral part of component development at Mound.

PB83-851501 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electroexplosive Devices. 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Oct 82.
Oct 82, 179p

This bibliography contains citations concerning the design, production, and applications of electric detonators, initiators, and igniters for electroexplosive devices. Topics include analysis of various solid explosives, delay initiators, AC and DC firing circuits, arming devices, low-voltage detonators, and bridgeware initiators. Aerospace, weapon systems, mining, and oil drilling applications are included. (Contains 157 citations fully indexed and including a title list.)

PB83-851519 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electroexplosive Devices. June, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 53p
Supersedes PB80-853575.

This bibliography contains citations concerning the design, production, and applications of electric detonators, initiators, and igniters for electroexplosive devices. Topics include analysis of various solid explosives, delay initiators, AC and DC firing circuits, arming devices, low-voltage detonators, and bridgewire initiators. Aerospace weapon systems, mining, and oil drilling applications are included. (This updated bibliography contains 55 citations, 13 of which are new entries to the previous edition.)

PB83-852533 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electroexplosive Devices. June, 1974-October, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-Oct 82.
Oct 82, 107p
Supersedes PB80-853690.Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

This bibliography contains citations concerning the design, production, and applications of electric detonators, initiators, and igniters for electroexplosive devices. Topics include analysis of various solid explosives, delay initiators, AC and DC firing circuits, arming devices, low-voltage detonators, and bridgewire initiators. Aerospace, weapon systems, mining, and oil drilling applications are included. (This updated bibliography contains 101 citations, 39 of which are new entries to the previous edition.)

19C. Combat Vehicles

AD-A119 745/8 PC **A03**/MF **A01**
Army Tank-Automotive Command, Warren, MI.
Evaluation of Wheel and Tire Compatibility between Prime Movers and Assigned Trailers.
Technical rept. Mar-Sep 82,
Stan Bienkowski, and Craig Filus. 21 Sep 82, 37p
Rept no. TACOM-TR-12677

Due to the recent modernization of the tactical wheeled vehicle fleet, many trucks no longer have interchangeable wheels and tires with their assigned trailers. The Tactical Wheeled Vehicle Office has therefore compiled a list of the truck/trailer combinations which do not have a get home capability in the event of a flat tire. (Author)

AD-A119 753/2 PC **A05**/MF **A01**
Naval Surface Weapons Center, Dahlgren, VA.
MC4000 Auxiliary Mover.
Final rept.,
Dan G. Haywood. Mar 82, 83p Rept no. NSWC/TR-81-454

This report documents efforts to provide an improved local mobility for the M198 towed howitzer. The main efforts were directed to the design, fabrication, and testing of the items deemed necessary to provide the MC4000 rough terrain forklift with the capability to perform as an auxiliary mover for the M198 towed howitzer. Other efforts consisted of investigations of alternative functions for the enhanced MC4000 within and outside the artillery community. The performance of the enhanced MC4000 exceeded expectations and predictions. The MC4000 exceeded its requirements as an auxiliary mover for the M198 and excelled in handling other towed artillery, towed equipment, and functions outside the artillery community. (Author)

19D. Explosions, Ballistics, and Armor

DE82006922 MF **A01**
Sandia National Labs., Albuquerque, NM.
Ytterbium Fluid-Coupled Gage.
C. W. Smith, and G. W. Burnside. 1982, 11p SAND-82-0409C, CONF-820334-1
Contract AC04-76DP00789
Defense Nuclear Agency conference on instrumentation for nuclear weapons effects, White Oak, MD, USA, 30 Mar 1982.
Best available copy from document source. Available in microfiche only.

The piezoresistive ytterbium fluid-coupled gage is a useful tool to measure the radial stress-time waveform in divergent flow fields. Fluid coupling eliminates lateral strain effects which would compromise the output and eliminates the ytterbium gage hysteresis seen in unaxial strain conditions. A field experiment shows that fluid-coupled gages exhibit no serious under-registration effects at the one kilobar stress level and show good amplitude agreement with a radial stress measurement. (ERA citation 07:047972)

19E. Fire Control and Bombing Systems

AD-A119 460/4 PC **A06**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
Directed Beam Alignment System Testing Program.
Final rept. Dec 78-Jun 79,
Robert F. Gates. 4 Jun 79, 119p Rept no. TRW-33556
Contract DAAK40-79-C-0018

A technique has been developed for six-degree-of-freedom coordinate frame alignment between remote battlefield vehicles. It was developed specifically for a High Energy Laser Weapon application which must hand off a target from a radar vehicle to a laser vehicle to milliradian accuracy. Laboratory hardware was used from rooftops in Redondo Beach to validate the concept experimentally. In a field environment, an alignment should take less than 30 sec, work to ranges beyond 3 km, and work in visibilities less than 4 km. (Author)

19F. Guns

AD-A119 456/2 PC **A02**/MF **A01**
Army Test and Evaluation Command, Aberdeen Proving Ground, MD.
Schedules and Procedures for Inspections and Measurements of Cannon.
Final rept. on test operations procedure.
16 Sep 82, 11p Rept no. TOP-3-2-800
Supersedes rept. no. TOP-3-2-800 dated 6 Jan 76, AD-A036 659.

Describes procedures for inspecting and measuring cannon, including inspection frequency and condemnation criteria for cannon components. Provides references for techniques including use of stargage, pullover gage, and borescope; impressions and casts of bores; and magnetic particle, magnetic recording borescope, radiographic, ultrasonic, and liquid penetrant inspections. Applies to large-caliber guns, howitzers, mortars, and recoilless rifles. (Author)

AD-A119 653/4 PC **A02**/MF **A01**
Army Armament Research and Development Command, Watervliet, NY. Large Caliber Weapon Systems Lab.
Manufacture of Split Ring Breech Seals.
Final technical rept.
1 Sep 82, 11p

Using funding appropriated in FY79 preliminary engineering was conducted to examine the present methods used in the manufacture of split rings. This report is the culmination of an effort to examine the present methods of manufacturing split ring breech seals and to establish new manufacturing procedures and equipment to improve the quality and lessen the high rejection rates experienced using the present methods of machining. Initial engineering analysis revealed that the manufacturing difficulties experienced are predominant in three machining operations: (1) kinking; (2) Splitting; and (3) Polishing the split surfaces. This report addresses those areas.

AD-A119 726/8 PC **A07**/MF **A01**
Southwest Research Inst., San Antonio, TX.
The Influence of Tube Support Conditions on Muzzle Motions.
Final technical rept. Mar 79-Jun 82,
P. A. Cox, and J. C. Hokanson. Jun 82, 138p ARO-15722.2-EG
Contract DAAG29-79-C-0037

This study addressed the effect of clearances between the tube and its support and the effect of support stiffness on the muzzle motions produced when a weapon is fired. A small-scale test weapon was designed, fabricated, and tested during the study. The test weapon included provisions for changing the clearance between the tube and the tube support sleeve and for changing support stiffness. Breech eccentricity and lubrication between sliding surfaces were also varied. A series of experiments was conducted in which tube support conditions were systematically varied and transverse motions of the tube were measured at eight locations. Additional measurements included tube recoil, timing of the firing pulse, chamber pressure, muzzle exit time, and muzzle velocity. Tube lateral motions were measured with noncontacting inductance transducers, and instrumentation systems for these and other transducers are described. Tube

motions of the test weapon were calculated by the finite element method for comparison with the experimental results. The initial positions of the tube within the tube support sleeve, tube radial expansion, and tube support stiffness were found to be significant parameters affecting the predicted tube motion. (Author)

20.

PHYSICS

20A. Acoustics

AD-A119 750/8 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Solving the Parabolic Equation for Underwater Acoustic Propagation by the Split-Step Algorithm.
Interim rept.,
L. F. Roche. 30 Aug 82, 29p Rept no. NRL-8607

Mathematical models of underwater acoustic propagation are used in designing, deploying, and using underwater acoustic surveillance systems. This report documents a package of computer programs which solves the parabolic equation for underwater acoustic propagation using a split-step algorithm. These programs are implemented on the Texas Instruments Advanced Scientific Computer and make use of its pipelining and vectorizing capabilities. They include the ability to partially correct for the errors induced by the parabolic assumptions. All of the programs of this package can plot their outputs. These plots include sound-speed contours, sound-speed profiles, the initial pressure field, transmission loss as a function of range, transmission loss as a function of depth, transmission-loss histograms in specified range-and-depth regions, and intensity contours as a function of range and depth. The report summarizes the theory, describes the implementation, and tells how to run the programs. (Author)

DE82012717 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign.
Low-Temperature Ultrasonic Attenuation in Radially Cooled Niobium Containing Oxygen and Hydrogen.
K. F. Huang, A. V. Granato, and H. K. Birnbaum.
1982, 6p DOE/ER/01198-1377, CONF-820325-9
Contract AC02-76ER01198
International symposium on the electronic structure and properties of hydrogen in metals, Richmond, VA, USA, 4 Mar 1982.

Measurements of ultrasonic attenuation and velocity in dilute Nb-O-H alloys were made as a function of temperature, frequency, polarization, annealing temperature, isotope, and defect concentration. In addition to the stable 2.5 K relaxation peak found earlier by Poker, et. al., and additional peak at 6.3 K at 10 MHz was found when the specimen was rapidly cooled to He temperature. The peak correlated with the resistivity recovery found by Hanada for quenched specimens and corresponds to a complex with tetragonal symmetry. With the previous resistivity experiments mentioned above and the ultrasonic results described here, it can be concluded that peak 2 at 6.3 K arises from an OH complex. The simplest interpretation is that it represents an OH sub 2 complex. In a slow cooling process, one oxygen traps only one hydrogen and this OH pair is rather stable. In a rapid cooling process, some of the oxygen traps more than one hydrogen, forming OH sub 2 . However, the second hydrogen is less strongly bound than the first. During annealing, detrapping of one of the two hydrogens occurs and an OH sub 2 becomes an OH with freed hydrogen going into precipitates.

20B. Crystallography

AD-A119 791/2 PC **A03**/MF **A01**
Amorphous Materials, Inc., Garland, TX.
Large Plate CdTe Synthesis by Sealed Vessel Transport.
Quarterly technical rept. no. 3, 1 Jul-31 Aug 82,
A. R. Hilton. Sep 82, 38p Rept no. AMI-009
Contract MDA903-82-C-0159

The third quarterly report for the program to grow large plates of CdTe by vapor transport in a sealed system covers the period July-August, 1982. The decision was made last quarter to abandon the completely vapor growth process and to change to combination liquid-vapor process carried our in a three chamber quartz container. The results for the first three attempts have demonstrated the promise of the method. Large grain plates 6 in. in diameter weighing 1 Kgm were grown in less than 48 hours. Scale up to 8 in. diameter plates weighing several kilograms will occur in the next quarter. (Author)

PATENT-4 330 359 Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Electromigration Process for the Purification of Molten Silicon during Crystal Growth.
Patent,
P. J. Shlichta. Filed 10 Feb 81, patented 18 May 82, 7p N82-30105/2, PAT-APPL-6-233 269
Supersedes PAT-APPL-6-233 269.Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A process for the purification of molten materials during crystal growth by electromigration of impurities to localized dirty zones. In the Czochralski crystal growing process, the impurities are electromigrated away from the crystallization interface by applying a direct electrical current to the molten silicon for electromigrating the charged impurities away from the crystal growth interface. The edge-defined film-fed crystal growth process, a direct electrical current is applied between the two faces which are used in forming the molten silicon into a ribbon. The impurities, migrated to one side only of the crystal ribbon, may be removed or left in place. If left in place, they will not adversely affect the ribbon when used in solar collectors. The migration of the impurity to one side only of the silicon ribbon is especially suitable for use with asymmetric dies which preferentially crystallize uncharged impurities along one side or face of the ribbon.

PB83-851584 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Germanium: Epitaxial Growth. 1970-October, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1970-Oct 82.
Oct 82, 149p

This bibliography contains citations concerning the epitaxial growth of germanium on substrate crystals including silicon, sodium chloride, germanium, and gallium arsenide. Methods of deposition, including high vacuum, ultrahigh vacuum, and radiofrequency sputtering are included. Growth conditions, mechanisms, and crystal quality are considered. (Contains 222 citations fully indexed and including a title list.)

PB83-851592 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Germanium: Epitaxial Growth. 1976-October, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1976-Oct 82.
Oct 82, 199p

This bibliography contains citations concerning the substrates and growth conditions for the epitaxial growth of germanium crystals or films. The interface morphology, photoluminescence, and electrical and optical properties of the crystals are considered. (Contains 161 citations fully indexed and including a title list.)

PB83-851600 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Garnets: Epitaxial Growth. 1972-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1972-Oct 82.
Oct 82, 116p

This bibliography contains citations concerning the substrates and growth conditions for the epitaxial growth of garnet crystals and films. The morphology, and crystalline and magnetic properties of the crystals are included. Methods to measure and evaluate crystal and magnetic quality are considered. (Contains 114 citations fully indexed and including a title list.)

PB83-851618 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Garnets: Epitaxial Growth. 1976-October, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1976-Oct 82.
Oct 82, 271p

This bibliography contains citations concerning the substrates and growth conditions for the epitaxial growth of garnet crystals and films. The interface morphology and magnetic and crystalline properties of the crystals are discussed. (Contains 229 citations fully indexed and including a title list.)

20C. Electricity and Magnetism

AD-A119 711/0 Not available NTIS
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
Microstrip Capacitance for a Circular Disk through Matched Asymptotic Expansions,
W. C. Chew, and J. A. Kong. 17 Jun 80, 17p ARO-15653.64-EL
Contracts DAAG29-78-C-0020, E(11-1)-3070
Availability: Pub. in SIAM Jnl. of Applied Mathematics, v42 n2 p302-316 Apr 82 (No copies furnished by DTIC/NTIS).

No abstract available.

DE82700843 MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Three-Dimensional Distribution of the Magnetic Field in a Superconducting Dipole.
Z. V. Borisovskaya, S. B. Vorozhtsov, T. N. Dudareva, I. A. Shelaev, and I. P. Yudin. 1981, 9p JINR-R-9-81-63
In Russian.
U.S. Sales Only. Available in microfiche only.

Three-dimensional distributions of the magnetic field in a super-conducting dipole of the "window frame" type have been obtained by means of the GFUN3D program adapted on the CDC-6500 computer. Possibilities of the program are increased as a result of the description of a new configuration of winding. The influence of the dipole final length on field inhomogeneities is studied. Particular emphasis is placed upon the estimate of the contribution to the field inhomogeneities of the winding placed at the magnet edges. It is shown that the amplitudes of higher harmonics as a function of coordinate Z (magnet length) have large values at the magnet edges. The obtained distribution of the field level and of the higher harmonics amplitudes along the magnet axis allows one to estimate integral values of harmonics Hsub(n)(z)dz. The study has been made for induction of 0.6 and 2.5 T inside the magnet. (Atomindex citation 13:653915)

N82-31623/3 PC **A02**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Transient Stability of High Current Density Superconducting Wires.
D. E. Baynham, V. W. Edwards, and M. N. Wilson.
1980, 4p RL-80-066, CONF-800980-47
Presented at the Appl. Superconductivity Conf., Santa Fe, N. Mex., 29 Sep. 1980.

The transient stability of cooled superconductors is described. A theoretical model and the criteria for achieving an order of magnitude improvement in transient stability are delineated. Transient stability measurements on single wire NbTi and Nb3Sn samples subjected to 100 microsec heat pulses are reported. The order of magnitude improvement in stability predicted by the theoretical model, is shown by samples cooled with a porous metal surface heat exchanger.

PB83-852319 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Glow Discharges. 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Oct 82.
Oct 82, 285p
Supersedes PB81-854309.

This bibliography contains citations concerning the properties and applications of glow discharges. Studies of glow discharges include current flow, spectra, behavior at low pressure, behavior in turbulence, and effect in various gases, such as argon, neon, helium, and oxygen. Applications include use in spectroscopic examination of trace materials, surface conditioning of materials through coatings and film depositions, and intensification of chemical reactions. Applications also include synthesis of thin films and materials for solar cells. Excluded from this bibliography are glow discharges associated with fusion reactors and magnetohydrodynamics. (This updated bibliography contains 233 citations, 33 of which are new entries to the previous edition.)

PB83-852327 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Glow Discharges. 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Oct 82.
Oct 82, 243p
Supersedes PB81-854325.

This bibliography contains citations concerning the properties and applications of glow discharges. Studies of glow discharges include current flow, spectra, behavior at low pressure, behavior in turbulance, and effect in various gases, such as argon, neon, helium and oxygen. Applications include use in spectroscopic examination of trace materials, surface conditioning of materials through coatings and film depositions, and intensification of chemical reactions. Applications also include synthesis of thin films and materials for solar cells. Excluded from this bibliography are glow discharges associated with fusion reactors and magnetohydrodynamics. (This updated bibliography contains 254 citations, 54 of which are new entries to the previous edition.)

20D. Fluid Mechanics

AD-A119 487/7 PC **A02**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Dept. of Chemical Engineering.
On Viscous Dissipation Rates of Velocity Component Kinetic Energies,
Stanley Corrsin, and Jean-Louis Fournier. 18 Mar 80, 4p
Contract N00014-76-C-0048
Pub. in Physics of Fluids, v25 pt4 p583-585 Apr 82.

No abstract available.

AD-A119 645/0 PC **A02**/MF **A01**
Rockefeller Univ., New York.
Shock Wave Calculations.
Final rept. 1 Jul 79-30 Jun 82,
James Glimm. 30 Jun 82, 5p ARO-16006.11-MA
Contract DAAG29-79-C-1079

Discontinuities in Physical Systems and especially Fluids have been studied from the points of view of Scientific modelling, numerical analysis, simulation and software. (Author)

AD-A119 804/3 PC **A03**/MF **A01**
Minnesota Univ., Minneapolis. St. Anthony Falls Hydraulic Lab.
An Experimental Investigation of the Influence of an Air Bubble Layer on Radiated Noise and Surface Pressure Fluctuations in a Turbulent Boundary Layer.
Final rept. Jan 80-Sep 81,
John M. Killen. Sep 81, 29p Rept no. 202
Contract N00014-80-C-0209

An experimental investigation is described which shows relationships between the noise spectra of a layer of air bubbles in a turbulent flow and a maximum stable bubble size which can exist in the same flow. An air bubble layer with individual bubble sizes greater than a maximum stable size was introduced into the boundary layer of water flowing along a smooth flat plate. It was found that the maximum stable bubble size was related to the turbulent kinetic energy dissipation as had been previously shown by other investigators for a variety of turbulent flows. A unique 'corner frequency' of the noise spectra which resulted from the bubble splitting down to a maximum stable size could be also related to the turbulent kinetic energy dissipation of the boundary layer flow. (Author)

DE82008999 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Recent Progress in the Solution of the Time-Dependent, Three-Dimensional, Incompressible Navier-Stokes Equations.
P. M. Gresho, C. D. Upson, S. T. Chan, and R. L. Lee. Mar 82, 10p UCRL-87362, CONF-820702-3
Contract W-7405-ENG-48
International symposium on finite element methods in flow problems, Tokyo, Japan, 26 Jul 1982.

The discussion covers development of numerical methods which, while originally derived via the conventional Galerkin Finite Element Method (GFEM), have been significantly modified in the interest of cost-effectiveness to the point where they are referred to as a useful blend of finite element and finite difference methods. This paper summarizes the hybrid method and presents sample numerical results.

DE82012384 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Analysis of Transient, Erosive Flows.
S. W. Kang. 1981, 3p UCRL-86054, CONF-8110171-1
Contract W-7405-ENG-48
18. joint Army/Navy/NASA/Airforce combustion conference, Pasadena, CA, USA, 19 Oct 1981.

Theoretical analysis is made of surface heating history when a surface is exposed to transient thermal fluxes from a turbulent compressible boundary layer. The conservation equations are solved by means of a factored ADI method. Results display high heat fluxes at the surface, causing sufficient rise in surface temperatures to quickly reach melting in some substances. The melting liquid-layer case is also briefly discussed. (ERA citation 07:044419)

DE82902834 MF **A01**
Reactor Research Centre, Kalpakkam (India).
Two-Phase (Gas-Liquid) Pressure-Drop Calculations for Flow Through Circular Pipes.
R. Natarajan, S. B. Koganti, and G. R. Balasubramanian. 1979, 16p RRC-38
Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

A simplified graphical procedure which will avoid rigorous calculations, is presented for obtaining reasonably accurate pressure drop values in gas-liquid flows through circular pipes. This graphical solution utilizes Hughmark's hold up and Duckler's pressure drop equations. (ERA citation 07:044416)

NUREG/CR-2905 PC **A10**/MF **A01**
Lehigh Univ., Bethlehem, PA.
Raman Scattering Temperature Measurements for Water Vapor in Nonequilibrium Dispersed Two-Phase Flow.
Technical rept. Jun 81-Jun 82,
C. M. Anastasia, S. Neti, W. R. Smith, and J. C. Chen. Sep 82, 205p

The objective of this investigation was to determine the feasibility of using Raman scattering to measure vapor temperatures in dispersed two-phase flow as an alternative nonintrusive technique. The Raman system developed for this investigation is described, including alignment of optics and optimization of the photodetector for photon pulse counting. Experimentally obtained Raman spectra are presented for the following single and two-phase samples: liquid water, atmospheric nitrogen, superheated steam, nitrogen and water droplets in a high void fraction air/water mist, and superheated water vapor in nonequilibrium dispersed flow.

N82-31640/7 PC **A09**/MF **A01**
Old Dominion Univ., Norfolk, VA. Dept. of Oceanography.
The Receptivity of Boundary Layers on Blunt Bodies to Oscillations in the Free Stream.
Final Report.
C. E. Grosch. Aug 82, 188p NAS 1.26:169271, NASA-CR-169271
Contract NAG1-96

One aspect of the boundary layer receptivity problem is examined, that of the flow induced in the bounday layer on the forward portion of a blunt body by unsteadiness in the mean flow. An approximate solution for the disturbances generated in the boundary layer by a long wavelength sound wave impinging normally on the front of a body in steady motion is also provided.

N82-31644/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
A New Numerical Method for the Simulation of Three Dimensional Flow in a Pipe.
A. Leonard, and A. Wray. Jul 82, 11p NAS 1.15:84267, A-8980, NASA-TM-84267

A new numerical technique for simulating three dimensional, unsteady, incompressible pipe flows is presented and its utility and accuracy is shown. Each vector function in the expansion of the velocity field is divergence free and satisfies the boundary conditions for viscous flow. Some of the benefits of the expansion technique are that pressure is eliminated from the dynamics, only two unknowns per mesh point are required, implicit treatment of the viscous terms is provided at no extra computational cost, and no fractional time steps are required. The method uses spectral expansions: Fourier series in the azimuthal and streamwise directions, and Jacobi polynominals in the radial direction.

N82-31656/3 PC **A02**/MF **A01**
Waterloopkundig Lab., Delft (Netherlands).
Discrete Gas Model to Represent Distributed Free Gas in Liquids.
G. A. Provoost, and E. B. Wylie. Apr 82, 11p PUBL-263
Presented at 5TH Intern. Symp. On Water Column Separation, Obernach, West Germany, 28-30 Sep. 1981.

Transients in fluids containing free air which lumps the free gas at computational sections along, e.g., a pipeline, and treats the liquid between sections as if it were a liquid without free gas are modelled. In order to illustrate the influence of the procedure used to integrate the continuity equation at the discrete gas pockets, two examples, involving a single horizontal frictionless pipeline are given. In one, a transient is introduced by instantaneously lowering the upstream head from 60 m to 10.3 m (pipe level). In the other, upstream head is lowered to 30 m. Results for trapezoidal rule integration show high frequency oscillation after passage of sharp positive and negative pressure pulses. Forward integration results show numerical damping of the physical oscillation. Use of a small time increment reduces this effect.

N82-31657/1 PC **A06**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Lab. for Transport Engineering.
Pressure Losses in Pneumatic Transport. A Model Based on Particle-Wall Interactions and Particle Density Distribution.
Ph.D. Thesis.
J. A. Ottjes. Jun 82, 119p WTHD-145

An experimentally verified model which calculates pressure losses originating from dilute phase pneumatic transport of coarse particles in the horizontal stationary flow regime is presented. The model is based on the balance of drag and frictional forces on particles. The particles are characterized by their terminal velocity, the particle-wall sliding friction coefficient and the coefficient of restitution between particles and wall. The influence of the inhomogeneous

particle distribution in the pipe is taken into account, by a particle density distribution, which resembles the barometric height formula. A Froude number, based on the mean square value of the radial particle-velocity component, is used as an empirical parameter. This number increases with increasing average air velocity, but perhaps depends on pipe diameter and solids-mass flow. The assumption of a linear relationship between the Froude number and the average air velocity provides scaling and predicting possibilities for pressure losses.

N82-31658/9 PC **A03**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).
On Local-Relaxation Methods and Their Application to Convection-Diffusion Equations.
E. F. F. Botta, and A. E. P. Veldman. 4 Sep 81, 44p
NLR-MP-81052-U
Submitted for Publication.

A local relaxation (LR) method, based on successive over-relaxation (SOR) theory, is presented. The performance of LR methods is illustrated by applying them to central-difference approximations of convection-diffusion equations. It is found that equations with small diffusion coefficients can be handled without difficulty. For equations with strongly-varying coefficients, and for nonlinear equations, an LR method can be significantly more efficient than the optimum SOR method. For example, a 16 x 16 driven-cavity problem for a Reynolds number of one million can be solved in just a few seconds on a CDC 6600 computer.

PB83-111591 PC **A03**/MF **A01**
Iowa Inst. of Hydraulic Research, Iowa City.
A Porous Wavemaker Theory,
Allen T. Chwang. Oct 82, 31p IIHR-255
Grant NSF-CEE80-20564

A porous wavemaker theory is developed to analyze small-amplitude surface waves on water of finite depth, produced by horizontal oscillations of a porous, vertical plate. Analytical solutions in closed forms are obtained for the surface wave profile, the hydrodynamic pressure distribution and the total force on the wavemaker. The influence of the wave-effect parameter C and the porous-effect parameter G, both being dimensionless, on the surface waves and on the hydrodynamic pressures is discussed in detail.

PB83-114686 PC **A05**/MF **A01**
Technische Hogeschool, Delft (Netherlands).
De Invloed van de Uitstroomkondities op het Ontwikkelingsgebied van een Ronde Vrije Turbulente Straal (Influence of Initial Conditions on Development Region of Free Round Turbulent Jet,
H. Fondse. May 82, 91p
Text in Dutch.Portions of this document are not fully legible.

The development region of a free round turbulent jet was experimentally investigated in order to determine the systematic dependence of the jet development on the initial conditions. In particular the effect of the initial conditions on the entrainment rate in both the axisymmetric mixing layer region and at a distance of 20 diameters of the nozzle was investigated.

20E. Masers and Lasers

AD-A119 457/0 PC **A04**/MF **A01**
Philips Labs., Briarcliff Manor, NY.
Development of a Novel Laser Material for Miniaturized Laser Systems.
Final technical rept. 8 Nov 80-31 Dec 81,
Walter Zwicker, and Sel Colak. May 82, 51p
Contract MDA903-81-C-0034, DARPA Order-4040

Single crystals of NdP5O14, NdLiP4O12, and NdAl3(BO3)4 were grown from various type of fluxes. Miniature laser rods up to 2 x 2 x 20 mm in size were fabricated from crystals of NdP5O14. The spectroscopic properties of these compounds are compared, and data are given of the lasing experiments with NdP5O14 on laser pulse energies, pulse shapes, and beam divergences at different repetition rates with and without Q-switching. Single-pulse output energies up to 240 mJ in the free-oscillation mode and up to 30 mJ in the Q-switched mode were obtained. Repetitive pulsed operation was possible at rates of 5-10 pps with forced gas cooling. Single crystals of (RE)P5O14, (RE)LiP4O12, and (RE)Al3(BO3)4 with Er(3+), as well as with Gd and Yb, were grown and studied spectroscopically. The data shows that these materials have Er(3+) luminescence properties similar to those of Er(3+) in other hosts which have shown lasing. (Author)

AD-A119 539/5 PC **A03**/MF **A01**
Aerospace Corp., El Segundo, CA. Aerophysics Lab.
Production of Electronically Excited Bi(2D3/2).
Technical rept.,
John M. Herbelin, Robert Giedt, and Henry A. Bixler.
16 Aug 82, 27p TR-0082(2930-01)-2, SD-TR-82-57
Contract F04701-81-C-0082

Emission signals at 8758 A were observed when bismuth atom vapor was introduced into a supersonic flow of electronically excited nitrogen fluoride, NF(a singlet Delta). A correlation of thermal and pressure data with the appearance of the chemiluminescence, along with a computer analysis of the IRTV observations at two wavelengths, is presented. On the basis of an analysis of these data, it is concluded that the observed emission results from the production of an excited-state bismuth atom density, Bi(doublet D three halves), on the order of > 10 to the 13th power atoms cm-3 by collisional transfer with NF(a singlet Delta). (Author)

AD-A119 540/3 PC **A04**/MF **A01**
Aerospace Corp., El Segundo, CA. Aerophysics Lab.
Operating Characteristics of HSURIA Annular Resonator with a W-Axicon and a Rear Flat Cavity Mirror.
Technical rept.,
Eugene B. Turner, Richard A. Chodzko, and Stephen B. Mason. 12 Jul 82, 55p TR-0082(2930-01)-6, SD-TR-82-48
Contract F04701-81-C-0082

In this report are presented the results of tests performed on the half-symmetric unstable resonator with an internal axicon (HSURIA) using a large diameter, closed-cycle CO2 laser facility. The HSURIA used for these tests consisted of a linear W-axicon, a convex spherical feedback mirror and a flat rear cavity mirror. This resonator produced a linearly polarized $I = 0$ mode of good beam quality. Tests were designed to investigate several critical issues related to the use of the HSURIA with a cylindrical chemical laser, namely, the misalignment sensitivity of the elements, optical effects of support struts, and the feasibility of reducing the high flux on the W-axicon tip by obscuration of the tip. Tests were performed for a variety of resonator configurations with different parameters. The beam quality was rapidly degraded by small angular misalignments of the rear flat but was scarcely affected by much larger misalignments of the feedback mirror. The insertion of strut masks resulted in an unexpectedly large power loss. Analysis indicates that these losses are caused by diffraction effects combined with partial saturation of the medium. A small effective obscuration of the W-axicon tip had little effect on the mode or beam quality, but obscuration diameters with a Fresnel number approaching unity (referred to as the compacted leg length) caused a loss of mode control and a large degradation in beam quality.

AD-A119 583/3 PC **A04**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Excitation of Mercuric Bromide by Electrons.
Final rept. 15 May 81-30 Jun 82,
P. J. Chantry, and C. L. Chen. 30 Aug 82, 61p Rept no. 82-9C1-EXCIT-R1
Contract N00014-81-C-0518

Computer modelling of the HgBr discharge laser requires as input the various cross sections for electron impact on HgBr2. One of the most important of these is the cross section for production of the HgBr* (B doublet sigma one-half), the upper laser state, by electron impact on HgBr2. This report describes work performed to measure the total emission cross section for production of the HgBr B-X fluorescence. Under the conditions of the experiment this corresponds to the total formation cross section for the HgBr*(B) state. A magnetically collimated electron beam (1-200 eV) crosses a low density molecular beam of HgBr2. The apparatus permits simultaneous measurements of negative ion, positive ion, and wavelength resolved photon production from HgBr2, and from permanent bottled gases. The relative wavelength dependence of the photon counting system has been determined from 280 to 640 nm using standard lamps. By comparison with known ionization and total emission cross sections in He, it is possible to measure total emission cross sections for other molecules whose ionization cross sections are known. The HgBr*(B) emission extends from 510 nm to beyond 350 nm, and appropriate integration over wavelength is necessary. The resulting cross section has a sharp onset at 6.0 eV and rises rapidly to a plateau with a mean value of 3.2 (-16) sq cm. In the region (3-5 eV) of dissociative attachment HgBr*(B) production is undetectable, corresponding to sigma $<$ (-18) sq cm. (Author)

AD-A119 709/4 Not available NTIS
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
Generation, Stabilization, and Amplification of Subpicosecond Pulses,
S. R. Rotman, C. Roxlo, D. Bebelaar, T. K. Yee, and M. M. Salour. 12 Nov 81, 9p ARO-17209.41-EL
Contract DAAG29-80-C-0104
Availability: Pub. in Applied Physics B, v28 p319-326 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

DE82008131 MF **A01**
Los Alamos National Lab., NM.
Pulse Propagation in Free-Electron Lasers with a Tapered Undulator.
J. C. Goldstein, and W. B. Colson. 1981, 7p LA-UR-82-186-Rev., CONF-811229-6
Contract W-7405-ENG-36
International conference on lasers, New Orleans, LA, USA, 14 Dec 1981, Portions of document are illegible.
MN only.
Microfiche copies only.

The one-dimensional theory of short pulse propagation in free electron lasers is extended to tapered undulator devices and is used to study the behavior of an oscillator with parameter values close to those expected in forthcoming experiments. It is found that stable laser output is possible only over a small range of optical cavity lengths. Optical pulse characteristics are presented and are found to change considerably over this range. (ERA citation 07:054725)

20F. Optics

AD-A119 495/0 PC **A06**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
High-Pressure Viewports for Infrared Systems. Phase 2. Chalcogenide Glass.
Final rept. Oct 80-Sep 81,
J. D. Stachiw, and S. L. Bertic. 28 Jan 82, 123p Rept no. NOSC/TR-634
See also Phase 1, AD-A097 089.

An experimental study established the effectiveness of chalcogenide glass composition AMTIR-1 (Ge33As12Se55) as structural material and/or coating material or windows in IR systems operating in a marine environment. Test results show that the optical and structural properties of the material are not degraded by continuous or intermittent submersion in seawater. A tremendous potential reduction in expenditures would result from its application wherever feasible. (Author)

AD-A119 665/8 Not available NTIS
Rochester Univ., NY. Inst. of Optics.
Exact Solution of the Zero Crossing Rate of a Differentiated Speckle Pattern,
Junji Ohtsubo. 4 Jan 82, 7p ARO-16864.5-PH
Contract DAAG29-80-K-0048
Availability: Pub. in Optics Communications, v42 n1 p13-18, 1 Jun 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 786/2 PC **A03**/MF **A01**
Aerospace Corp., El Segundo, CA. Space Sciences Lab.

Pulsed DF Chain-Laser Breakdown Induced by Maritime Aerosols.
Technical rept.,
S. T. Amimoto, J. S. Whittier, F. G. Ronkowski, P. R. Valenzuela, and G. N. Harper. 30 Aug 82, 32p TR-0082(2720)-1, SD-TR-82-61
Contract F04701-81-C-0082

Thresholds for breakdown induced by liquid and solid aerosols in room air have been measured for a 1 microsec-duration pulsed D2-F2 laser of 3.58 -4.78 micron bandwidth. The DF laser beam was directed into an aerosol chamber that simulated maritime atmospheres on the open sea. Both focus and collimated beams were studied. For a focused beam in which the largest encountered aerosol particles were of 1 to 4 micron diameter, pulsed DF breakdown thresholds were measured to lie in the range 0.6 to 1.8 GW/sq cm. Salt-water aerosol breakdown thresholds for micron-size particles were found to be 15 to 30% higher than the corresponding thresholds for freshwater particles. For a collimated beam that encountered particle diameters as large as 100 microns, breakdown could not be induced using 0.5- microsec (FWHM) pulses at peak intensities of 59 MW/sq cm. Image converter camera measurements of the radial plasma growth rate of 1.3 cm/microsec (at 1.4 GW/sq cm) were consistent with measurements of the cutoff rate of the transmitted laser beam. Pulsed DF breakdown thresholds of 32 MW/sq cm for 30- micron diameter Al2O3 particles were also measured to permit comparison with the earlier pulsed-HF breakdown results of Lencioni, et al.; the solid-particle threshold measurements agree with the Lencioni data if one assumes that the thresholds for microsecond-duration pulses scales is 1/lambda. An approximate theoretical model of the water particle breakdown process is presented that permits the scaling of the present results to other laser pulse durations, aerosol distributions, and transmission path lengths.

DE82011193 MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Durable Innovative Solar Optical Materials: The International Challenge.
C. M. Lampert. Jan 82, 9p LBL-13753, CONF-820107-8, EEB-W---82-02
Contract W-7405-ENG-48
SPIE optical coatings for energy efficiency and solar applications conference, Los Angeles, CA, USA, 25 Jan 1982, Portions of document are illegible.
Microfiche copies only.

A variety of optical coatings are discussed in the context of solar energy utilization. Well known coatings such as heat mirrors, selective absorbers, and reflective films are covered briefly. Emphasis is placed on the materials limitations and design choices for various lesser known optical coatings and materials. Physical and optical properties are detailed for protective antireflection films, fluorescent concentrator materials, holographic films, cold mirrors, radiative cooling surfaces, and optical switching films including electrochromic, thermochromic, photochromic, and liquid crystal types. For many of these materials research is only now being considered, and various design and durability issues must be addressed. (ERA citation 07:049859)

N82-32144/9 PC **A04**/MF **A01**
Istituto Superiore di Sanita, Rome (Italy). Lab. delle Radiazoni.
Production and Detection of Uv Radiation Produzione E Misura Della Radiazione U.V..
M. Cremonese, and M. Matzeu. 18 May 81, 64p ISS-R-81/5, ISSN-0390-6477
In Italian; English Summary.

Different ways to produce artificially UV radiation, uses in various fields (scientific, medical and industrial), detection and measuring are described. Measurements, including the determination of spectral distribution in the 200 to 400 nm band, and the angular power distribution of a solar lamp and a germicide UV lamp are presented.

PAT-APPL-6-378 535 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Dual Aperture Multispectral Schmidt Objective.
Patent Application,
P. O. Minott. Filed 13 May 82, 15p N82-30073/2, NASA-CASE-GSC-12756-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A dual aperture, off-axis catadioptic Schmidt objective is formed by symmetrically aligning two pairs of Schmidt objectives on opposite sides of a common plane. Each objective has a spherical primary mirror with a spherical focal plane and center of curvature aligned along an optic axis laterally spaced apart from the common plane. A multiprison beamsplitter with burned dichoic layers and a convex entrance and concave exit surface optically concentric to the center of curvature may be positioned at the focal plane. The primary mirrors of each objective may be connected rigidly together and may have equal or unequal focal lengths.

PAT-APPL-6-395 431 PC **A03**/MF **A01**
Department of the Navy, Washington, DC.
Polarimetric Image Recorder.
Patent Application,
Irwin Schneider, and Charles S. Guenzer. Filed 6 Jul 82, 27p AD-D009 709/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A polarimetric image recorder which records only the net polarization of the viewed scene. An optical lens system projects the light originating from the viewed scene onto a thin layer of an alkali halide crystal containing anisotropic color centers. Polarized light reorients the color centers and creates a net polarization in the layer. The net polarization of the layer is read by such means as shining polarized light through the layer and then through a polarizer set perpendicularly to the polarization of the light source. Whatever light is viewed through the reader represents a net polarization in the scene. (Author)

PATENT-4 332 441 Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Coherently Pulsed Laser Source.
Patent,
J. S. Margolis. Filed 15 May 80, patented 1 Jun 82, 6p N82-29589/0, PAT-APPL-6-150 040
Supersedes PAT-APPL-6-150 040, N80-24602 (18 15, p 1983).Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

An electronically controllable apparatus is described which modulates a continuous wave laser beam so as to produce an output beam consisting of coherent pulses that are electronically controllable as to both pulse repetition rate and pulse width. The apparatus includes two acoustic devices positioned so that the laser beam passes through them in sequence, and apparatus for passing sound waves through the devices to frequency shift the laser radiation as well as to diffract it. Each acoustic device generates sound waves containing a group of frequencies which result in spaced pulses. The first acoustic device is countered by the second acoustic device to produce a collimated, coherently pulsed, laser beam.

PB83-111609 PC **A10**/MF **A01**
National Bureau of Standards, Boulder, CO.
Optical Fiber Characterization: Backscatter, Time Domain Bandwidth, Refracted Near Field, and Interlaboratory Comparisons (Volume 1).
Special pub.,
B. L. Danielson, G. W. Day, D. L. Franzen, E. M. Kim, and M. Young. Jul 82, 208p NBS-SP-637-VOL-1
Library of Congress catalog card no. 82-600563.
Sponsored in part by Deptartment of Defense, Washington, DC., and Army Communications Research and Development Command, Fort Monmouth, NJ.

Optical fiber waveguide measurements are described. Systems to determine the backscatter, bandwidth, and index profile are covered in detail. Measurement comparisons between laboratories are given for fiber attenuation, bandwidth, numerical aperture, and core diameter.

20G. Particle Accelerators

AD-A119 584/1 PC **A02**/MF **A01**
Mission Research Corp., Albuquerque, NM.
Modified Betatron Stability Calculations.
Interim rept.,
Brendan B. Godfrey, and Thomas P. Hughes. Aug 82, 15p Rept no. AMRC-N-207
Contract N00014-81-C-0647

Cold beam linear growth rates of the negative mass and resistive wall instabilities in a high current modified betatron have been determined numerically. The resistive wall instability is much slower than the negative mass instability even for large wall resistivities.

DE82009091 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Vacuum Design for the Disk-and-Washer Accelerator Structure.
J. R. Ruhe, and L. D. Hansborough. Feb 82, 21p LA-9216-MS
Contract W-7405-ENG-36
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The disk-and-washer (DAW) accelerator structure is being developed for several applications. Because of its complicated geometry and newness, vacuum calculations for the DAW accelerator structure are not yet formalized. The applicable vacuum equations for this structure are presented and correlations for it have been made with the vacuum data from the Clinton P. Anderson Meson Physics Facility side-coupled accelerator structure. A calculation is presented for the DAW structure proposed for the Pion Generator for Medical Irradiations (PIGMI) accelerator. (ERA citation 07:044508)

DE82011121 MF **A01**
Wisconsin Univ.-Madison.
Radio-Frequency He exp - Source and a Source of Negative Ions by Cesium Sputtering.
J. H. Billen. 1980, 5p DOE/ER/00007-931, CONF-801111-59
Contract AC02-76ER00007
Conference on application of accelerators in research and industry, Denton, TX, USA, Nov 1980, Portions of document are illegible.
Available in microfiche only.

Two sources of negative ions are described. An rf source produces up to 14 mu A beams of He exp - by charge exchange in Rb vapor. The other Source of Negative Ions by Cesium Sputtering (SNICS) produces a wide variety of negative ion beams in the mu A range. Two important features of SNICS are its simple, compact construction and its very good beam emittance (2 to 4 pi mm mrad MeV exp 1). Both sources have lifetimes >200 hours and they are used extensively on the Wisconsin EN tandem. (ERA citation 07:047805)

DE82013294 MF **A01**
Austin Research Associates, Inc., TX.
Design Study for a High-Current, Steady-State Autoresonant Accelerator. Final Report, July 14-November 14, 1979.
W. E. Drummond. Dec 79, 217p DOE/ER/05911-T2, COO-5911-4
Contract AC05-78ER05911
Portions of document are illegible.
Available in microfiche only.

During the past year and a half, both theoretical and engineering investigations have been carried forward in a research program to assess the feasibility, and provide conceptual designs and engineering design studies for high current, steady state Auto-Resonant Accelerators. The behavior of each of the various components of an Auto-Resonant Accelerator has been carefully examined for the case of moderately relativistic electron energy and high electron current which will be appropriate for steady state operation. In general, a very considerable amount of progress has been achieved on the front-end components of the accelerator, with design options narrowed significantly and preliminary design parameters even determined for the power supplies, the electron beam source, the radiation shielding, the convergent Pierce gun diode, and the electron cyclotron wave exciter. For the downstream accelerator components consisting of the gas cell and electrode structures which are used to generate and load the ions into the cyclotron wave and to eliminate secondary electrons, conceptual designs have been realized; however, some further work remains to be done before an optimized engineering design of these components can be constructed for a

first experimental test of a steady state Auto-Resonant Accelerator.

DE82013446 MF **A01**
Oak Ridge National Lab., TN.
Theoretical Considerations on the Performance of Negative Sputter Ion Sources.
G. D. Alton. 1981, 7p CONF-810468-13
Contract W-7405-ENG-26
International conference on electrostatic accelerator technology, Oak Ridge, TN, USA, 13 Apr 1981, Portions of document are illegible.
Available in microfiche only.

Theoretical analyses of experimentally observed negative ion yield data from cesium rich plasma discharge sources such as those based on the University of Aarhus source concept appear to correlate experiment and theory through surface ionization mechanisms for many species. The agreement between experiment and theory is rather remarkable considering the idealistic model used. A few atomic species appear to overproduce relative to the simple theoretical model. These deviations suggest that still other mechanisms may be important for certain elements such as the affinity level mechanism recently reported. (ERA citation 07:044490)

DE82013474 MF **A01**
Oak Ridge National Lab., TN.
Radiation Lifetimes and Failure Mechanisms of Carbon Stripper Foils.
R. L. Auble. 1981, 5p CONF-810468-12
Contract W-7405-ENG-26
International conference on electrostatic accelerator technology, Oak Ridge, TN, USA, 13 Apr 1981, Portions of document are illegible.
Available in microfiche only.

Measurements of lifetimes of thin carbon foils under heavy-ion irradiation are compiled and recent advances in stripper foil technology are reviewed. The impact of recent foil lifetime improvements, many by more than an order of magnitude, on heavy-ion electrostatic accelerators is discussed. Foil inhomogeneities, particularly those caused by sputtering are suggested to be a prime factor in usable foil lifetimes.

DE82014280 MF **A01**
Fermi National Accelerator Lab., Batavia, IL.
Fermilab Tevatron.
L. C. Teng. Feb 81, 22p FNAL-TM-1044
Contract AC02-76CH03000
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

A summary is given of the Fermilab Tevatron project. The project is organized into three phases. The first includes the superconducting magnet ring, minimal refrigeration and rf for slow acceleration of a beam to approximately 1 TeV. The second involves additional refrigeration and rf for fast pulsing up to approximately 2 min exp -1 . Third phase includes beam extraction and switchyard modifications, experimental areas and beams modifications and additions.

DE82014887 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Alternative Procedures for the Determination of Approximate Configurational Invariants.
L. S. Hall. 14 May 82, 12p UCID-19384
Contract W-7405-ENG-48

The conditions for which Eq. (1) possesses an additional isolating invariant are given in Reference 1, hereafter called I. This work also showed how to obtain approximate invariants for many systems that do not admit an exact additional integral of the motion. The examples given in I were somewhat special, and depended upon expansions that do not apply in some problems of considerable interest. In particular, we want to pave the way here for application to the problem of large-orbit particles in a magnetic confinement system (e.g., alpha -particles in a tandem mirror), looking for a substitute invariant when the magnetic moment fails. We give here the analytic foundations of the procedures for computing an approximate invariant for more general V(x,y). In the following we continue to take omega (x,y) = 0; the presence of a small toroidal magnetic field can be incorporated by the perturbation methods given in I.

DE82700839 MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Universal Dynamic Power Supply.
M. N. Gorokhov, A. A. Kardash, V. A. Medvedev, V. K. Perebejnos, and V. G. Shirokov. 1980, 16p IFVE-OKU-80-134
In Russian.
U.S. Sales Only. Available in microfiche only.

High accuracy power supply is considered. The power supply is intended for the feeding of the U-70 accelerator correction coils, galvanic not grounded. The correction coils are the active-inductive loadings with different time constants and induced EMF. The parameters of the power supply are: accuracy +- 0.3 %, working current ranges 0-10 A, control pulse frequency band - 100 Hz. A possibility to obtain variable signs in current pulse is shown. (Atomindex citation 13:653906)

DE82700840 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Beam Interception System of the IHEP Proton Synchrotron.
A. A. Aseev, S. L. Kuchinin, V. N. Lebedev, K. P. Myznikov, and V. N. Chepegin. 1980, 18p IFVE-OUNK/ORI-80-104
In Russian.
U.S. Sales Only.

IHEP accelerator beam intensity increase up to 5x10 exp 13 prot/cycle after putting into operation of 1.5 GeV ring booster-injector results in increasing instantaneous and residual radiation fields at the accelerator. Owing to this fact the equipment service life will be shorter. Interception and localization of proton beam losses at one place are practically the only method to proiong the equipment service life to cut down losses and, accordingly, radiation fields at the rest part of the accelerator perimeter. A system consisting of scattering targets, an absorber and external protection intended for beam halo stripping and localization of proton beam losses in a wide energy range from 1.5 to 70 GeV at the IHEP accelerator is considered. The system also permits to shape a sharp beam boundary before its output from the accelerator, and when it is necessary, to provide for complete beam absorption at an intensity up to 5x10 exp 13 prot/cycle. Estimated values of beam absorption efficiency under different conditions of the system operation are given. Happing of the sharp beam boundary by withdrawal of a particle share having the amplitudes of betatron oscillations inadmissible for the output systems permits to improve the quality of external beams used in physical experiments and makes it possible to decrease radiation loads on these system equipment. (Atomindex citation 13:653907)

DE82700841 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
JINR Synchrophasotron. Performance and Improvement (3 Quarter of 1980).
M. A. Voevodin, V. P. Zabolotin, and L. P. Zinov'ev. 1980, 9p JINR-9-81-17
In Russian.
U.S. Sales Only.

Information on the performance of the accelerator in the third quarter of 1980, on intensity of deuteron beams, helium and carbon nuclei is given. Experiments being carried out on the synchrophasotron beam are listed. Under operating conditions the automatized system for measuring the configuration factor of magnetic field inhomogeneity on-line with the EC-1010 computer is tested. In order to increase the energy of the electron beam of CRYON source a new small-size high voltage multiplier has been developed. The results of geodesic measurements are presented. (Atomindex citation 13:653913)

DE82700842 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods.
Excitation of Ring Screen Period Structure by a Moving Electron Bunch.
V. N. Mamonov, and S. V. Rubin. 1981, 16p JINR-R-9-81-62
In Russian.
U.S. Sales Only.

The field and current quasiperiodicity at the system screens has been used for constructing a convenient representation (with analytically separated singularity) of kernel of the principle integer equation that defines solution of structure excitation problem. The fact that we are taking into account the singularity character has allowed us to apply the Dmitriev-Zakharov procedure of numerical equation solution. The character of the singularity demonstrates that noncorrect solution in the given case (function determination, satisfying the Fredgolm equation of the first kind) admits self-regularization. In the given solution the conditions at sharp edges of the screens are essentially used. The calculation example of the energy quantity lost by bunch particles during structure period over low range radiation excitation is given. The application of "optical parabolic equation" procedure for estimating r.f. spectrum part is suggested. (Atomindex citation 13:653914)

DE82903322 MF **A01**
National Research Council of Canada, Ottawa (Ontario).
Position Resolution of the Time-Projection Chamber at TRIUMF.
C. K. Hargrove, H. Mes, and A. Bennett. Mar 82, 5p TRI-PP-82-9, CONF-820237-3
International conference on instrumentation for colliding beam physics, Stanford, CA, USA, 17 Feb 1982, Portions of document are illegible.
Microfiche copies only. U.S. Sales Only.

We have investigated the spatial resolution of the TRIUMF time projection chamber (TPC). The dominant effects on the resolution are diffusion, track-anode crossing angle, vector E X vector B forces in the region of the anode wire and clustering of the primary ionization. A formulation of these effects has been used to determine the mean collision time, the diffusion constant, the Lorentz angle in the anode wire regon and the spatial resolution as a function of the crossing angle for a gas mixture of Ar (80%), CH sub 4 (20%) at atmospheric pressure. The minimum resolution, sigma approx. 200 mu m, occurs when the track crossing angle equals the Lorentz angle. As the angle moves away from this value the resolution deteriorates rapidly due to the discrete nature of the ionization process. (ERA citation 07:047844)

DE82903342 MF **A01**
Bhabha Atomic Research Centre, Bombay (India). Nuclear Physics Div.
120-KV Ion-Implantation System.
M. S. Bhatia, P. K. Bhattacharya, S. Gaonkar, M. J. Kansara, and N. Sarma. 1980, 72p BARC-1089
Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

A compact and versatile heavy ion accelerator has been constructed for the uniform implantation of wafers with beams of microamperes and acceleration voltages of up to 120 keV. The mass analysis of the ion beam is carried out within the high voltage terminal at an energy of 10 keV after beam formation and focussing by an Extractor-cum-Einzel lens. The electromagnet utilized for this was of 14 exp 0 bending angle. Acceleration is provided by a modified insulated core transformer of five sections operating on three phase power input. Provision is made for the implantation of either single targets and for the batch implantation of up to 36 wafers at a time. The ion source is a Nielsen type in which evaporation and ionization are achieved by the impact of thermionic electrons from a hot filament. It is capable of delivering currents in the microampere range for most of the elements and accepts liquid, solid and gaseous charges. While the facility enables implants of a wide range of doses, species and energies, it is mainly used for boron and phosphorous doping in semiconductors. Electrostatic scanning in two dimensions ensures maximum uniformity. All controls are operated at ground potential and are easily accessible. (ERA citation 07:047800)

DE82903389 MF **A01**
Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
Gas-Target Neutron-Generator Studies.
V. Chatoorgoon. Oct 81, 154p UTIAS-251
Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

In 1975 Stangeby et al proposed a gas target, termed the Subsonic Gas Target (SGT). It was suggested that heat deposition in a subsonic channel might have the effect of creating a gas density step which would constitute an attractive gas target type. A theoretical analysis of the SGT concept is given. It is shown that heat deposition in a subsonic flow can indeed cause the for-

mation of gas density gradients which constitute useful gas targets. The variation of beam voltage, gas density, gas pressure, gas temperature, etc., within the channel are calculated as a function of the system parameters: beam voltage, beam current, channel diameter, stagnation tank temperature and pressure. The analysis is presented as applicable to any combination of beam particle and target gas. For the case of T exp + on D sub 2 , which is relevant to the fusion application, the 14 MeV neutron profiles are presented as a function of system parameters. It is found that the SGT is compatible with concentrated intense source operation. The SGT involves a boot-strap effect since the beam, in effect, creates its own target. The possibility of instability therefore arises, and this was investigated in detail. Rather than employ a linearized analysis appropriate for small perturbations, a nonlinear analysis is used and this makes it possible to follow the complete time-development of the SGT. It is found that the SGT is stable against all small perturbations and against certain types of large perturbations. Also a particular problem associated with the straight hypersonic target is studied, namely, the deuterium spill into the tritium port. The regime of practical operation for this target is established. (ERA citation 07:044517)

20H. Particle Physics

DE82007719 MF **A01**
State Univ. of New York at Albany.
High-Energy Channeling and Its Applications. Progress Report for Period May 1, 1981-December 1, 1981.
W. M. Gibson, and C. R. Sun. Dec 81, 7p DOE/ER/05001-4
Contract AC02-78ER05001
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Progress is reported in these areas; proton channeling through bent crystals at GeV energies; gamma radiation from 10 GeV positrons channeled in silicon monocrystal; and other publications during the year reported. (ERA citation 07:044951)

DE82008365 MF **A01**
Oregon Univ., Eugene. Inst. of Theoretical Science.
Forward Production of Baryons in Quark and Gluon Jets.
G. Eilam, and M. S. Zahir. Jun 81, 29p DOE/ER/70004-315
Contract AT06-76ER70004
Portions of document are illegible. MN only.
Microfiche copies only.

Inclusive production of protons in quark and gluon jets is calculated in perturbative QCD and recombination model. We first calculate the inclusive distribution of a parton jet to decay into three quarks, and then recombine them to form a proton. The computation is performed in the framework of the same model that successfully describes the production of pions in parton jets. Our results, which are applicable to x greater than or equal to 0.5 show a small production of baryons with p/ pi approx. 1%. We point at other possible sources of baryons which must be operative if the low x data showing abundant production of baryons will persist at higher x and high q exp 2 . (ERA citation 07:052013)

DE82006398 MF **A01**
Oregon Univ., Eugene. Inst. of Theoretical Science.
Parity-Violating Spin Asymmetries in Large p/sub T/ Massive-Lepton Pair Production in the Collision of Polarized Hadrons.
K. Hidaka. Sep 81, 17p DOE/ER/70004-318
Contract AT06-76ER70004
Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

We make predictions for parity violating spin asymmetries in large p/sub T/ massive lepton pair production in the collision of longitudinally polarized hadrons using the QCD perturbation theory and the electroweak gauge model in the framework of a hard scattering model. Sizable asymmetries are predicted at typical energies of the big colliding beam machines of the near future. Experimental tests should be possible in the near future, e.g., at ISABELLE, Fermilab-TEVATRON and CERN-anti p p-collider. (ERA citation 07:052015)

DE82009957 PC **A02**/MF **A01**
Rockefeller Univ., New York.
Triple-Jet Structures in Proton-Proton Interactions.
A. L. S. Angelis, H. J. Besch, and B. J. Blumenfeld. Jul 81, 4p DOE/ER/40033-22, CONF-810760-13
Contract AC02-81ER40033
International conference on high energy physics, Lisbon, Portugal, 9 Jul 1981.

In this experiment, which uses a superconducting solenoid at the CERN ISR, a large sample of two-jet events produced in proton-proton collisions at 62 GeV centre-of-mass energy has been examined for evidence of three-jet structures; that is, for the presence of events in which three particle jets can be separately identified at large transverse momenta relative to the initial proton directions, there also being spectator jets following these directions, making five jets in all. Such three-jet events are expected to be produced by gluon bremsstrahlung, as has been observed in the e exp + e exp - case, but several additional mechanisms are expected in the case of hadronic collisions. The three-jet events are identified by cluster analysis, the particles of each event being sorted into the best three-cluster and two-cluster combinations. Results are briefly described. (ERA citation 07:044954)

DE82011413 MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA.
High-Resolution Study of (Pi exp + ,Pp), (Pi exp + ,Pd) and Other (Pi exp + ,XX) Reactions on exp 6 exp 7 Li, exp 14 N, and exp 16 O.
W. R. Wharton. 1981, 9p DOE/ER/03244-87, CONF-8110152-3
Contract AS02-76ER03244
AIP conference on pion production and absorption in nuclei, Bloomington, IN, USA, 22 Oct 1981, Portions of document are illegible.
Available in microfiche only.

There is a large amount of high quality two-particle coincidence data from pion annihilation on light nuclei at several energies between 38 and 90 MeV. All of this data is either in the reduction stage or is still the primitive on-line data collected during the monitoring of our recent experiment. The purpose of this paper is two-fold: (1) to convey the measuring capability of a coincidence experiment of this type using the most modern experimental apparatus; (2) to give a feeling for the great variety and depth of knowledge which such high quality data can provide concerning pion annihilation in nuclei. The data was obtained by the Carnegie-Mellon nuclear physics group during the last two years at the LEP channel at LAMPF, using two spectrometer systems to detect charged particles in coincidence. (ERA citation 07:052117)

DE82012142 MF **A01**
Los Alamos National Lab., NM.
Multigroup Processing ENDF/B Dosimetry Covariances.
D. W. Muir, R. E. MacFarlane, and R. M. Boicourt. 1982, 10p LA-UR-82-735, CONF-820321-17
Contract W-7405-ENG-34
ASTM-EURATOM symposium on reactor dosimetry, Gaithersburg, MD, USA, 22 Mar 1982, Portions of document are illegible.
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The methodology of multigroup processing of ENDF/B dosimetry covariance (uncertainty) information is discussed, with specific references to the ERRORR covariance module of the NJOY nuclear data processing system. Also discussed is the recent application of ERRORR to the generation of a 137-group, 35-material covariance library for dosimetry applications, and a compact format for storing and transmitting fine-group covariance libraries is introduced. (ERA citation 07:045147)

DE82012703 MF **A01**
Abilene Christian Univ., TX.
Precision Measurements of Pion-Nucleon Interactions in the P exp 3 Energy Region at LAMPF. Progress Report.
M. E. Sadler. Feb 82, 65p DOE/ER/40036-1
Contract AS05-81ER40036
Portions of document are illegible.
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A summary is presented of the progress and of the planned activities for investigations of pion-nucleon scattering and other investigations which yield information on charge symmetry and isospin invariance. This research program is conducted by Abilene Christian University at the Clinton P. Anderson Meson Physics Facility (LAMPF) in close collaboration with the UCLA Particle Physics Group. The overall objectives, progress and planned activities of the research programs are described and the contributions made by ACU faculty and student are delineated. (ERA citation 07:048416)

DE82013242 PC **A06**/MF **A01**
South Carolina Univ., Columbia. Dept. of Physics and Astronomy.
High Resolution Positron Q-Value Measurements and Nuclear Structure Studies Far from the Stability Line. Progress Report.
F. T. Avignone, III. 28 Feb 82, 102p DOE/ER/10434-3
Contract AS09-79ER10434

Research progress in briefly described, and details are presented in the attached preprints and reprints: (1) precision mass differences in light rubidium and krypton isotopes utilizing beta endpoint measurements; (2) precision mass measurements utilizing beta endpoints; (3) Monte Carlo calculations predicting the response of intrinsic GE detectors to electrons and positrons; and (4) reactor antineutrino spectra and nuclear spectroscopy of isotopes far from beta stability. (ERA citation 07:045093)

DE82013385 MF **A01**
Harvard Univ., Cambridge, MA. Gordon McKay Lab.
Class of Potentials with Extremely Narrow Resonances. I. Case with Discrete Rotational Symmetry.
A. Grossmann, and T. T. Wu. Jan 81, 17p DOE/ER/03227-T2
Contract AS02-76ER03227
Portions of document are illegible.
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We consider a quantum-mechanical particle in three dimensions, subject to point interactions (Fermi pseudopotentials) placed on the vertices of a regular plane polygon. If N, the number of vertices, tends to infinity and the distance between two consecutive interaction centers tends to a constant, we show that our system has resonances that tend exponentially fast to the real axis. We discuss several conjectures on the generality of this result and stress its relevance as a simplified model for the Yagi-Uda antenna array of classical electromagnetism.

DE82013439 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Averaging sigma(N, gamma) in the Transition Region E/sub n/ = 1-150 KeV.
R. L. Macklin. 1982, 3p CONF-820436-2
Contract W-7405-ENG-26
NEANDC/NEACRP specialists meeting on fast-neutron capture cross sections, Argonne, IL, USA, 20 Apr 1982.

The technique of determining a smooth average neutron capture cross section by least squares adjustment of strength functions is illustrated for exp 179 Hf(n, gamma) high resolution data from ORELA. The s-, p- and d-wave neutron strength functions and GAMMA/ sub gamma // <D/sub l=0> found agree well with systematics, model calculations and other experimental information despite their strong correlation when determined solely from the capture data. (ERA citation 07:045150)

DE82013454 MF **A01**
Oak Ridge National Lab., TN..
Review of Fast-Neutron Capture Cross Sections of the Higher Plutonium Isotopes and Am-241.
L. W. Weston. 1982, 14p CONF-820436-1
Contract W-7405-ENG-26
NEANDC/NEACRP specialists meeting on fast-neutron capture cross sections, Argonne, IL, USA, 20 Apr 1982, Portions of document are illegible.
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The fast-neutron capture cross sections of Pu-240, 241, 242 and Am-241 are reviewed. These nuclides are important to core physics of reactors that contain Pu-239. There have been several significant measurements of these cross sections in recent years. These measurements were instigated by the need for these cross sections for reactor calculations involving high burn-up and build-up of the higher actinides.

These recent measurements have satisfied the urgent need for these cross sections in the context of the accuracy needed relative to these of the major fissile isotopes. Problems that exist in the experimental measurements and their evaluation are discussed.

DE82014629 PC A02/MF A01
City Coll., New York.
Measurements of Parity Violation in the Scattering of Polarized Electrons from Protons.
P. A. Souder, V. W. Hughes, M. S. Lubell, and S. Kowalski. 1980, 14p DOE/ER/40017-2
Contract AC02-81ER40017

A new generation of experiments measuring the parity violating interference between the weak and electromagnetic interactions in the scattering of polarized electrons from hydrogen is described. The goal of these experiments is to measure independently each of the four electron-nucleus electro-weak coupling constants. The precision obtainable in terms of the coupling constants will be about an order of magnitude better than the deep inelastic scattering experiment at SLAC. A wide range of beam energies, from 0.6 GeV to 2.0 GeV, will be required. The large duty factor of the proposed accelerator will have important advantages, including simplification of the polarized electron source and lowering of the instantaneous rate of detected events to the level where individual pulses can be counted. For the higher energy data conventional large-acceptance magnetic spectrometers will be appropriate, and for the lower energies special Cherenkov or total absorption counters will be developed. A 30 cm long liquid hydrogen target compatible with a 100 mu a beam current will also be required.

DE82014998 PC A03/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Funny Hills in Pion Spectra from Heavy-Ion Collisions.
J. O. Rasmussen. Mar 82, 33p LBL-14174
Contract W-7405-ENG-48

A discussion of some of the systematic features of the pion spectra in heavy-ions reactions is given. A discussion of the hills and valleys in heavy ion pion spectra that show up at the lower pion energies is given. The following topics are discussed: (1) three kinds of funny hills; (2) pi exp - / exp + ratios near center of mass; (3) new Monte Carlo studies of charged pion spectra; and (4) pion orbiting about fireballs and Bose-Einstein behavior as explanation for the mid-rapidity P/sub perpendicular to/ approx. = 0.4 to 0.5 m/sub pi /c hill.

DE82015243 PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Two Recent Charm Search Experiments with the Multiparticle Spectrometer at BNL.
S. U. Chung. Jan 82, 10p BNL-31198, CONF-820143-4
Contract AC02-76CH00016
17. Recontre de Moriond workshop on new flavours, Les Arcs, France, 24 Jan 1982.

Two recent experiments at the BNL Multiparticle Spectrometer searched for charm production in the pi exp - p interactions at 16 and 17 GeV/c. One experiment looked for D/sup */ exp - production with a fast K exp + trigger, while the other experiment triggered on single-electron events. The K exp + -trigger experiment finds that the D/sup */ exp - cross-section at 16 GeV/c is less than 130 nb at 95% confidence level.

DE82015897 PC A02/MF A01
Los Alamos National Lab., NM.
Neutron-Capture Cross Sections of the Tungsten Isotopes exp 182 W, exp 183 W, exp 184 W, and exp 186 W from 2.6 to 2000 KeV.
R. L. Macklin, D. M. Drake, and E. D. Arthur. Apr 82, 24p LA-9200-MS
Contract W-7405-ENG-36

Neutron-capture cross sections of four stable tungsten isotopes were measured as a function of energy by time of flight at the Oak Ridge Electron Linear Accelerator. The resolution achieved, delta E/E about 1/750 FWHM, has allowed the analysis of several hundred resonance peaks at energies a few kiloelectron volts above the neutron-binding energy. Strength functions were fitted to the average cross sections up to about 100 keV, and average cross sections were extended with less precision from 100 to 2000 keV. The capture cross section of natural tungsten was calculated from measurements for individual isotopes. Compound nucleus calculations have been made with deformed optical model parameters for comparison with experimental cross sections.

DE82903172 MF A01
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de Documentation.
Experimental Study of the Fast-Neutron Scattering from exp 24 Mg, exp 28 Si and exp 32 S.
A. Virdis. Dec 81, 103p CEA-R-5144
In French.Portions of document are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Differential cross section measurements for neutron scattering from exp 24 Mg, exp 28 Si and exp 32 S at 9.76 and 14.83 MeV incident neutron energies have been undertaken. The experimental technique is based on the time-of-flight method with a pulsed neutron beam. Scattered neutrons have been detected by a spectrometer composed of five detectors. Elastic and inelastic scattering cross sections for levels of up to 6 MeV excitation energy have been obtained for the angular range from 15 to 160 exp 0 in 5 exp 0 steps. These measurements will be used in a coupled-channel analysis to extract potential and deformation parameters. (ERA citation 07:045125)

DE82903390 MF A01
Commission of the European Communities, Geel (Belgium). Central Bureau for Nuclear Measurements.
Annual Progress Report on Nuclear Data, 1979.
Jun 80, 50p NEANDC(E)-212-V.3, INDC(EUR)-013/G
Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

Progress is summarized on neutron cross section measurements for actinide nuclei and structural materials; studies on the decay of exp 93 Nb/sup m/, exp 141 Ce, exp 133 Ba, exp 241 Pu, exp 238 Pu, exp 57 Co, and exp 109 Cd; international comparison of activity measurements of exp 134 Cs solutions, exp 137 Cs solutions, exp 55 Fe solutions, and exp 133 Ba solutions; and other projects. Publications, conference papers, and report titles are listed. CINDA entries are listed. (ERA citation 07:045101)

DE82903412 PC A02/MF A01
Vienna Univ. (Austria). Inst. fuer Theoretische Physik.
Comparison of Three Quark Bound-State Masses for Various Potentials.
D. Flamm, and F. Schoeberl. 1981, 12p UWThPh-1982-1

We test the assumption of a universal flavor independent potential by applying several potentials which give good results for mesons to the baryon case. To calculate the mass spectrum we propose a variational method based on an expansion in terms of harmonic oscillator wave functions. A comparison with other approximation schemes favors our method.

N82-32101/9 PC A02/MF A01
Melbourne Univ., Parkville (Australia). School of Physics.
Neutrino Oscillation and Rare Muon Decays in the Presence of a Heavy Neutrino.
B. H. J. Mckellar. 1980, 8p UM-P-80/31

Heavy neutrinos are recognized as providing a possible mechanism for muon number violating processes. Rates for these processes depend on neutrino mixing angles and masses. If the heavy neutrino mass is less than 400 MeV, it is shown that the present limit on muon neutrino - electron neutrino oscillations provides very stringent limits on the contribution of these processes to the rates for muon number violating processes.

N82-32102/7 PC A02/MF A02
Melbourne Univ., Parkville (Australia). School of Physics.
Phenomenological Nucleon-Nucleon Interaction.
L. Petris. 1980, 19p UM-P-80/34

A phenomenological NN interaction which fits the deuteron properties and the elastic scattering data, is presented. The only parameters are the pion, rho and omega masses and one overall strength.

N82-32103/5 PC A02/MF A01
Melbourne Univ., Parkville (Australia).
The Influence of Mixing of Finite Mass Neutrinos on beta Decay Spectra.
B. H. J. Mckellar. 1980, 8p UM-P-80/50

Neutrino mixing, of the type required for neutrino oscillations, complicates efforts to determine the electron neutrino mass from the beta decay spectra. The shape of the spectra depends on the masses and mixing angles of all neutrinos which couple to the electron neutrino.

N82-32104/3 PC A02/MF A01
Melbourne Univ., Parkville (Australia).
Neutrino Oscillations and Anti nu sub (E)-E Scattering.
B. Halls, and B. H. J. Mckellar. 1980, 10p UM-P-80/53

Electron antineutrino-electron scattering is modified in the presence of neutrino mixing and neutrino oscillation. In the Weinberg-Salam model the results for reactor antineutrinos are insensitive to the degree of mixing, to the extent that the experiment of Reines, Gurr and Sobel cannot differentiate between no oscillation and complete disappearance of the electron antineutrinos from the beam.

N82-32105/0 PC A02/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Elastic Scattering and Charge-Exchange of Pions by 3He at the Intermediate Energies.
V. B. Belyaev, S. A. Rakityanskii, and J. Wrzecionko. 1980, 13p JINR-E-2-80-219

An attempt is made to describe the experimental data on elastic interaction of pi(+-) mesons with light nuclei in the energy region 68 to 208 MeV. As the theoretical basis, the approximate four particle equations modified in the spirit of the impulse approximations are used. The agreement with the data in the forward hemisphere for all energies is achieved. For the backward scattering, the agreement exists only at 68 MeV and 208 MeV pion energy.

N82-32106/8 PC A02/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR).
Application of the Approximate Four Body Equations to Description of the Elastic Scattering and Charge Exchange of Pions by He3 Nucleus.
V. B. Belyaev, M. G. Sapozhnicov, and J. Wrzecionko. 1980, 12p JINR-E-4-13030
Submitted for Publication.

In the framework of the approximate four body equations the elastic scattering and charge exchange of pions on He-3 nucleus in the 68 to 208 MeV pion energy range is investigated. These equations differ from the description within the optical model with the first order optical potential in two aspects. The equations are derived without the impuse approximation. The rescattering of pions on nucleus is taken into account in all orders. Basic equations are derived. The strong dependence of the obtained cross sections of elastic scattering on the form of parametrization of the elementary pi N interaction indicates the necessity of a more thorough study of pi nuclear cross sections as functions of the off mass shell behavior of elementary pi N amplitudes. The energy dependence of the charge exchange cross section at the fixed scattering angle 115 deg displays a more sharp decrease with increasing than that observed experimentally.

N82-32107/6 PC A02/MF A01
Melbourne Univ., Parkville (Australia). School of Physics.
Photoneutron Cross Section of Si-29.
R. E. Pywell, B. L. Berman, P. Kean, and M. N. Thompson. 1981, 15p UM-P-80/68

The photoneutron cross section of Si-29 has been measured over the energy range 8 to 28 MeV using the bremsstrahlung yield curve technique. The giant dipole resonance is observed to be centered at 21.2 MeV and is 5.5 MeV wide. In addition, a pygmy resonance containing much fine structure is observed below 17 MeV. An attempt is made to interpret these observations in terms of the weak coupling of the extra neutron to a Si-28 core. However, detailed comparisons of the structure and relative strengths of the Si-28 and Si-29 cross sections reveal that the coupling of the extra-core nucleon is large and significantly modifies the core wave function.

N82-32110/0 PC **A02/MF A01**
Melbourne Univ., Parkville (Australia). School of Physics.
Oscillations of Massless Neutrinos as a Refractive Phenomena.
G. I. Opat. 1980, 9p UM-P-80/36

A phenomenology of neutrino oscillations is presented, based on the assumption that massless neutrinos are refracted in ordinary matter by an interaction, important at low energy, which causes transitions between neutrinos of differing kind. The predictions are experimentally distinguishable from those based on the vacuum oscillations of massive neutrinos.

N82-32111/8 PC **A02/MF A01**
Melbourne Univ., Parkville (Australia). School of Physics.
Oscillation and Mixing of Massless Electron and Muon Neutrinos.
B. H. J. Mckellar. 1980, 6p UM-P-80/30

It is not necessary that the electron neutrino and muon neutrino themselves have mass for oscillations to occur. For N neutrinos, if one is massive, oscillations occur with unique oscillation length determined by the mass of the heavy neutrino, mimicking two-neutrino mixing. Any observation of oscillations cannot therefore be regarded as evidence for a finite mass electron neutrino or muon neutrino.

N82-32119/1 PC **A03/MF A01**
Istituto Superiore di Sanita, Rome (Italy). Lab. delle Radiazoni.
A New Approach to the Calculation of Ground State Properties of Few-Body Systems UN Nuovo Metodo Per la Risoluzione Del Problema di Pochi Nucleoni Interagenti Tramite Potenziali Realistici. Ph.D. Thesis.
S. Simula. 24 Mar 81, 26p ISS-P-81/2, ISSN-0390-6469
In Italian; English Summary. Submitted for Publication.

A variational approach of the calculation of the ground state of few interacting nucleons is presented. The method is based on a variational wave function obtained by expansion of a correlated harmonic oscillator. Calculations for two nucleons show that the maximum number of harmonic oscillator quanta which have to be included in the expansion is much less than the corresponding number resulting from the expansion in a pure harmonic oscillator.

N82-32130/8 PC **A03/MF A01**
Istituto Superiore di Sanita, Rome (Italy). Lab. delle Radiazoni.
Statistical Analysis of Experimental Data Gathered at ADONE Analisi Statistica Dei Dati Sperimentali Raccolti at ADONE.
C. Stanescu. 2 Jul 81, 38p ISS-R-81/8, ISSN-0390-6477
In Italian; English Summary.

The statistical analysis of high energy physics experiments carried out with ADONE is described. The experiment determined the energy dependance of the hadrons formed after a position-electron collision. The internal consistency of the available data was examined and the existence of a fine structure was investigated using the whole set data. A high significance level is found for the 1.5 GeV experimental data, but further specific experiments do not confirm the existence of such a fine structure.

N82-32163/7 PC **A02/MF A01**
Istituto Superiore di Sanita, Rome (Italy). Lab. delle Radiazoni.
On the Existence of a Nonuniform Spin-Isospin Ordered Phase in High-Density Neutron Matter.
O. Benhar. 5 Jun 81, 18p ISS-P-81/6, ISSN-0390-6469
Submitted for Publication.

Using a Jastrow-like correlated wave-function and a realistic two-body interaction, the energy per particle of neutron matter was evaluated in the normal uniform phase and in a pi deg-condensed phase exhibiting one-dimensional density fluctuations and spin-isospin order. The numerical results indicate that the standard configuration is energetically favored, even at very high densities.

PB83-112128 PC **A03/MF A01**
National Bureau of Standards, Washington, DC.
Status of Electron Transport Cross Sections.
S. M. Seltzer, and M. J. Berger. Sep 82, 33p NBSIR-82-2572
Sponsored in part by National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center, Department of Energy, Washington, DC. Office of Health and Environmental Research, and Office of Naval Research, Arlington, VA.

This report describes recent developments and improvements pertaining to cross sections for electron-photon transport calculations. The topics discussed include: (1) electron stopping power (mean excitation energies, density-effect correction); (2) bremsstrahlung production by electrons (radiative stopping power, spectrum of emitted photons); (3) elastic scattering of electrons by atoms; (4) electron-impact ionization of atoms.

20I. Plasma Physics

AD-A119 468/7 PC **A03/MF A01**
Science Applications, Inc., McLean, VA.
Radiation from High Temperature Plasmas. Phase II.
Final rept. 15 Jul 81-14 Jul 82,
Christopher Agritellis. Aug 82, 35p Rept no. SAI-83-883-WA
Contract N00014-81-C-2398
See also AD-A113 597.

A large number of atomic physics and magnetohydrodynamic computer codes have been developed by members of the NRL Plasma Radiation Branch of the Naval Research Laboratory over several years. These codes involve the simulation of complex physical processes in a variety of plasma radiation research investigations. In this research effort, the structure of many of these codes was analyzed to improve the numerical procedures or to speed calculational time by code vectorization. In addition, graphic techniques were developed to improve the display of the results, which is important both to detect coding errors and to elucidate physical mechanisms. In this report, we describe the codes that were improved and present examples of the graphical displays now available for analysis of the calculational results. (Author)

AD-A119 567/6 PC **A03/MF A01**
Science Applications, Inc., Boulder, CO. Plasma Research Inst.
Nonlinear Bernstein-Greene-Kruskal Wave Equilibria Subject to Global Energy and Momentum Conservation Constraints.
Technical rept.,
Ronald C. Davidson, and Kang T. Tsang. Sep 82, 35p Rept nos. SAI-254-82-243-LJ, PRI-49
Contract N00014-79-C-0555

The class of Bernstein-Greene-Kruskal (BGK) solutions to the nonlinear Vlasov-Poisson equations are examined within the context of the conservation of (spatially averaged) number, momentum and total energy, imposed as ancillary global constraints that connect the final saturated BGK state to a specified initial distribution function f(x,v,O). While imposing three conservation constraints of course does not uniquely determine the final BGK state, it does not remove a large degree of ambiguity as to whether particular classes of solutions are accessible from given initial conditions. It also permits a determination of important features of the final BGK state (e.g., saturation amplitude, wave phase velocity, etc.) in terms of properties of the initial distribution functions.

AD-A119 569/2 PC **A02/MF A01**
Naval Research Lab., Washington, DC.
Flash X Radiography of Laser-Accelerated Targets.
Memorandum rept.,
R. R. Whitlock, S. P. Obenschain, and J. Grun. 30 Aug 82, 10p Rept no. NRL-MR-4860

Flash x radiography of ablatively accelerated planar foils has provided quantitative measurements and qualitative observations regarding several parameters of critical interest to direct illumination laser fusion. A 1.05 micron, 3.3 nsec driver beam was focused onto carbon foils in a large (0.7-1 mm diameter) spot to reduce edge effects. From images produced by a backlighting x-ray flash, we have measured overall coupling efficiency, smoothing of laser nonuniformities, target velocity, and ablation pressure. The high velocity targets maintain a localized, high density (> 3% of solid). In contrast to other workers' recent measurement of pressure from x-ray imaging, our x-radiographic results, including pressure, are in general agreement with earlier NRL studies. Our results have also provided further insights into double foil interactions and planar target preheat measurements. (Author)

DE82012407 MF **A01**
General Atomic Co., San Diego, CA.
Real Time Two Wavelength Interferometer System.
S. T. Lee, and D. R. Baker. Feb 82, 6p GA-A-16496, CONF-811040-171
Contract AT03-76ET51011
Symposium on engineering problems of fusion research, Chicago, IL, USA, 26 Oct 1981, Portions of document are illegible.
Available in microfiche only.

A two wavelength interferometer system is used to measure the electron density in Double III. THe use of two separate wavelengths allows the resolution of phase shifts due to changes in plasma density and phase shifts due to mechanical vibrations. The initial system collected the measured phase shifts during a shot and then subsequent to the shot the electron density as a function of time was calculated in a minicomputer. A system is described which uses a combined analog and digital electronic circuit to produce the plasma density as a function of time during the progress of the shot, i.e., in real time. The phase shifts are obtained by an accurate instantaneous measurement of the intermediate frequency is obtained by mixing the light in the plasma path with the doppler shifted light in the reference path. Mathematical operations are performed on these measured phase shifts by the logic circuit resulting in a real time measurement of the plasma density.

DE82015165 MF **A01**
Lawrence Livermore National Lab., CA.
Time-Resolved X-Ray Line Diagnostics of Laser-Produced Plasmas.
R. L. Kauffman, D. L. Matthews, J. D. Kilkenny, and R. W. Lee. 1982, 14p UCRL-87422, CONF-820553-2
Contract W-7405-ENG-48
12. anomalous absorption conference, Santa Fe, NM, USA, 10 May 1982.
Best available copy from document source. Available in microfiche only.

We have examined the underdense plasma conditions of laser irradiated disks using K x-rays from highly ionized ions. A 900 ps laser pulse of 0.532 mu m light is used to irradiate various Z disks which have been doped with low concentrations of tracer materials. The tracers whose Z's range from 13 to 22 are chosen so that their K x-ray spectrum is sensitive to typical underdense plasma temperatures and densities. Spectra are measured using a time-resolved crystal spectrograph recording the time history of the x-ray spectrum. A spatially-resolved, time-integrated crystal spectrograph also monitors the x-ray lines. Large differences in Al spectra are observed when the host plasma is changed from SiO sub 2 to PbO or In. Spectra will be presented along with preliminary analysis of the data.

DE82015822 PC **A02/MF A01**
Naval Research Lab., Washington, DC.
Spot Spectroscopy: Local Spectroscopic Measurements within Laser-Produced Plasmas. Interim Report.
M. J. Herbst, P. G. Burkhalter, R. R. Whitlock, J. Gruin, and M. Fink. 20 Apr 82, 17p NRL-MR-4812
Contract AI01-77DP40042

Use of a locally embedded tracer in laser-irradiated solid targets yields a localized source of diagnostic x-ray line radiation in the blowoff plasma. This technique potentially eliminates problems of chord-integration over regions of varying density and temperature in an inhomogeneous plasma, and reduces complications due to plasma opacity effects in the interpretation of spectra. Spectra obtained in an experimental test of this new technique are of a quality superior to those obtained from standard laser-produced plasmas, and should provide the best tests to date of spectroscopic models for these plasma conditions.

DE82700757 PC A03/MF A01
UKAEA Culham Lab., Abingdon (England).
Interpretation of Line-of-Sight Integral Measurements on Two-Dimensional Density Functions.
F. M. Larkin. Apr 81, 34p CLM-R-214
U.S. Sales Only.

The problem of interpreting line-of-sight integrated density measurements, transverse to a positive function of two independent variables, is discussed from the point of view of Optimal Approximation. One advantage of this approach is that points in the interpretation process where hard, but inescapable, intuitive choices must be made are clearly exposed. As well as the 'best' density estimate (in various Hilbert spaces) which can be obtained from the data, questions relating to its probable error, optimal positioning of the lines of sight and 'smoothing' of the observations are also discussed, without the necessity for introducing further ad hoc assumptions. (Atomindex citation 13:651893)

DE82700759 MF A01
Erevanskii Fizicheskii Inst. (USSR).
Annihilation Spectrum of Relativistic Electron-Positron Plasma.
F. A. Aragonyan, A. M. Atoyan, and R. A. Syunyaev. 1980, 40p EFI-432(39)-80
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

The annihilation spectrum of isotropically distributed monoenergetic electrons and positrons is obtained. The spectrum of the (e exp + e exp -) plasma is analyzed in a large range of plasma temperatures. The comparison of transitions peratures. The comparison of transitions intensities of annihilation radiation and bremsstrahlung shows that for temperatures kT<=3 mc exp 2 (e exp + e exp -) plasma is cooled mainly due to annihilation. The case of the fast positron annihilation on the rest electrons also considered. The possible astrophysical applications are discussed. (Atomindex citation 13:651896)

DE82700760 MF A01
Erevanskii Fizicheskii Inst. (USSR).
Polarization Losses of a Charged Particles in a Plasma Placed in the Strong High Frequency Circularly Polarized Field.
K. Z. Atsagortsyan, and S. S. Ehlbakyan. 1980, 9p EFI-451(56)-80
In Russian.
U.S. Sales Only. Available in microfiche only.

The polarization losses of the charged nonrelativistic particle passing through a plasma placed in the high frequency circular polarization field are considered. The influence of the external field both on variation of the plasma dispersion properties and on the probe particle motion is taken into account. It is shown that when the particle motion is normal to the polarization plane of the high frequency field, the decrease of the particle energy losses both for weak and strong fields takes place. The variation of the particle motion trajectory results in even more decrease of losses for the positron, whereas for the electron the both effects compensate each other. (Atomindex citation 13:651897)

N82-32145/6 PC A02/MF A01
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Experimental Work in Plasmas Developed at INPE. 1: Double Plasma Machine for the Study of Longitudinal Waves. 2: Plasma Centrifuge Trabalhos Experimentais Em Plasma, Desenvolvidos No Inpe. Imaquina de Plasma Duplo Para Estudo de Ondas Longitudinais. Ii-Centrifuga de Plasma.
J. L. Ferreira, E. Delbosco, and G. O. Ludwig. Feb 82, 16p INPE-2321-PRE/077
In Portuguese; English Summary. Presented at the 1ST Latin-AM. Meeting on Plasmas and Controlled Nucl. Fusion.

A double plasma machine used to study ion acoustic wave propagation is described. A plasma centrifuge project is also described. Some basic parameters of the apparatus used for isotope separation through electromagnetic rotation of the plasma are included.

N82-32170/4 PC A03/MF A01
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik med Fusionsforskning.
Toroidal EXTRAP Equilibria.
Research and Training Programme on Controlled Thermonuclear Fusion and Plasma Physics (EUR-NE).
J. Scheffel. Apr 82, 35p TRITA-PFU-82-06, ISSN-0348-7644

Ideal MHD equilibria for the toroidal EXTRAP configuration were computed with an equilibrium code. The free-boundary problem was solved by using the condition that the current density is proportional to a cylinder coordinate on a flux surface. The toroidal zeta pinch, initially induced in the central zero-field region of a transverse octupole field, drifts radially outwards producing an inverse D shaped cross section. The plasma current of this high beta equilibrium can be increased if the plasma is pushed back by altering the external confining magnetic field.

N82-32171/2 PC A03/MF A01
Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas (Netherlands). Inst. voor Plasma-Fysica.
Proposal for Time-Resolved Ion Temperature Measurements by Means of Rutherford Scattering of the Jet Heating Beams.
G. H. J. Notermans, H. W. Vanderven, and H. J. B. M. Brocken. Jan 82, 26p REPT-82-140
Sponsored by Euratom and Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek (Zwo).

A diagnostic method for measuring ion temperatures, based on single Rutherford scattering of high energy neutral particles, injected into the plasma is presented. Plasma ion temperature can be monitored using only one detector line of sight. The JET neutral heating beams provide the neutral particles. With a time-of-flight velocity detector used in combination with the JET neutral injectors, a time resolution of 0.1 sec can be achieved. This very compact detection system has an energy resolution of at least 160 for a 35 cm long flight path. Calculations show a very low sensitivity of the device for background neutrons and gamma radiation.

N82-32172/0 PC A02/MF A01
Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas (Netherlands). Inst. voor Plasma-Fysica.
A Summary of Processes Relevant for the Particle Balance of a Cold Plasma Blanket Contaminated with a Small Amount of Helium.
J. H. H. M. Potters, and W. J. Goedheer. Apr 82, 16p REPT-82-142
Sponsored by Euratom and Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek (Zwo).

Information needed when modeling cold plasma blankets is presented. Charge exchange, ionization, recombination, (de)excitation, and elastic scattering in a hydrogen plasma containing helium are discussed. Electrons, protons, hydrogen atoms (ground state, excited), alpha particles, He+ ions (ground state, excited) and helium ions (ground state, excited) are considered. Plasma temperature is below 100eV, electron density is between 3 times 10 to the 13th and 14th powers per cu cm.

20J. Quantum Theory

AD-A119 708/6 PC A02/MF A01
Columbia Radiation Lab. New York.
Billiard-Ball Echo Model.
Rept. for 1 Jun 81-31 May 82,
R. Beach, S. R. Hartmann, and R. Friedberg. 29 Oct 81, 10p
Contracts N00014-78-C-0517, DAAG29-79-C-0079
Pub. in Physical Review A, v25 n5 p2658-2666 May 82.

No abstract available.

N82-32109/2 PC A02/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Grassmann Analyticity and Extended Supersymmetries.
A. S. Galperin, E. A. Ivanov, and V. I. Ogievetsky. 1980, 8p JINR-E-2-80-750
Submitted for Publication.

A notion of Grassmann analyticity is introduced and it is shown how it helps to reduce the number of Majorana spinor variables. It is also shown that already in the N = 1 supersymmetry the chirality can be also interpreted as the analyticity. A complex superfield that satisfies the Cauchy-Riemann condition is shown to be analytic. It has been checked up that the hypercomplex coordinates form invariant spaces of the N = 4 supersymmetry and of N = 8 supersymmetry.

N82-32191/0 PC A02/MF A01
Nordisk Inst. for Teoretisk Atomfysik, Copenhagen (Denmark).
The Cross-over Points in Lattice Gauge Theories with Continuous Gauge Groups.
P. Cvitanovic, J. Greensite, and B. Lautrup. Jun 81, 14p DE81-700816, NBI-HE-81-26

The authors obtain a closed expression for the weak-to-strong coupling cross-over point in all Wilson type lattice gauge theories with continuous gauge groups. A weak coupling expansion of the mean field self-consistency equation is used. In all cases where the results can be compared with Monte Carlo calculations the agreement is excellent.

20K. Solid Mechanics

AD-A119 490/1 PC A03/MF A01
Propellants, Explosives and Rocket Motor Establishment, Westcott (England).
Reliability Analysis of Structures with Weibull Distributions of Load and Strength to a Given Confidence Level.
Technical rept.,
J. Margetson, and J. F. Laurillard. Jul 82, 28p
PERME-TR-182, DRIC-BR-83968

The statistical variation of load and strength is described by a three parameter Weibull distribution. The Weibull parameters are evaluated by a least square analysis and a method is presented which allows confidence bounds to be assigned to these quantities. A Monte Carlo analysis is used to calculate the reliability of the structure from the load and strength distributions. (Author)

AD-A119 497/6 PC A05/MF A01
Army Materials and Mechanics Research Center, Watertown, MA.
Work-in-Progress Presented at the Army Symposium on Solid Mechanics, 1982 - Critical Mechanics Problems in Systems Design.
Final rept.
Sep 82, 89p Rept no. AMMRC-MS-82-5
See also AD-A090 685.

In this report we discuss the work performed on the main component of the suspension system, the torsion bars. Torsion bars in the tank are designed to be mainly subjected to torsional loads, however, actual loading is feared to have some other stress components. In the first phase of the failure analysis, a bar which failed in the field was obtained. The examinations performed on the bar were: Magnetic flux examination of both parts of the failed bar, to determine any other cracks; Chemical analysis to evaluate conformity with the standards; Standard charpy specimens, for evaluating transition temperature; Pre-cracked charpy to evaluate fracture toughness; Tension test; Short-rod fracture specimen for evaluating fracture toughness; Rockwell hardness traverse; Fractographic examination of fracture surface, (a) light microscopy SEM, to locate the origin of cracks and the extent of fatigue crack growth, and Metallurgical Examination of Crystalline Structure in the gage and spline area.

AD-A119 571/8 PC A05/MF A01
Naval Postgraduate School, Monterey, CA.
Development of a Computer Program for the Testing and Evaluation of Numerical Optimization Techniques.
Master's thesis,
James Edward Fitzgerald, III . Jun 82, 83p

A three dimensional finite element code is written for truss analysis and design. Trusses may be designed for minimum weight subject to constraints on: member stresses, Euler buckling, joint displacements and system natural frequency. The optimum configuration may be found in addition to optimization with respect to member sizes. (Author)

AD-A119 586/6 PC A02/MF A01
Virginia Univ., Charlottesville. Dept. of Mechanical and Aerospace Engineering.
Transient Analysis of Structural Members Using a Continuous Space Continuous Time Method.
Technical rept.,
J. S. Strenkowski, Fei Hon Chu, and W. D. Pilkey. 5 Oct 80, 8p Rept no. A-82-9
Contract N00014-75-C-0374
Pub. in Computers and Structures, v14 n1-2 p89-95 1981. Sponsored in part by Grant NSF-ENG-79-08175.

No abstract available.

AD-A119 587/4 PC A02/MF A01
Virginia Univ., Charlottesville. Dept. of Mechanical and Aerospace Engineering.
Numerical Techniques for the Efficient Transient Response of Structural Members.
Technical rept.,
J. S. Strenkowski, and W. D. Pilkey. 1982, 4p Rept no. A-82-8
Contract N00014-75-C-0374
Pub. in Innovative Numerical Analysis for Applied Sciences, p487-489 n.d. Sponsored in part by Grant NSF-ENG79-08175.

No abstract available.

AD-A119 600/5 PC A02/MF A01
Virginia Univ., Charlottesville. Dept. of Mechanical and Aerospace Engineering.
Transient Response of Long Structural Members.
Technical rept.,
D. Hsu, and W. D. Pilkey. Jan 80, 11p Rept no. UVA/525303/MAE80/106
Contract N00014-75-C-0374

A technique is set forth by which the dynamic response can be found for long structural members with arbitrary axial variations in applied loading, geometry, and material. This simple procedure reduces the long member analysis to that of a member of finite length. (Author)

AD-A119 601/3 PC A03/MF A01
Virginia Univ., Charlottesville. Dept. of Mechanical and Aerospace Engineering.
Transverse Shear Stresses in Circularly Curved Bars.
Technical rept.,
Chirasak Thasanatorn, and W. D. Pilkey. Mar 80, 26p Rept no. UVA/525303/MAE80/107
Contract N00014-75-C-0374

Mathematical formulations and solution techniques are presented for the stress analysis of circularly curved bars subjected to transverse forces in the plane of curvature. The formulation follows the semi-inverse method of Saint Venant, using a stress function. Numerical results are obtained with a finite element method, which accepts curved bars with cross-sectional geometries. (Author)

AD-A119 604/7 PC A02/MF A01
Virginia Univ., Charlottesville. Dept. of Mechanical and Aerospace Engineering.
The Minimax Finite Element Method.
Technical rept.,
Il-Bahng Park, and W. D. Pilkey. 1982, 25p Rept no. A-82-7
Contract N00014-75-C-0374

In this paper, the minimax method is applied to boundary value problems which arise in structural mechanics. This is a weighted residual method in which the maximum absolute value of a residual is minimized. Like other weighted residual methods, a trial function is employed which consists of undetermined parameters and basis functions. This trial function is introduced into governing differential equations, and the maximum absolute residual among several residuals at discrete points in the domain is minimized. This residual minimization criterion is applied to a finite element formulation by using piece wise trial functions defined on each element. (Author)

AD-A119 605/4 PC A03/MF A01
Virginia Univ., Charlottesville. Dept. of Mechanical and Aerospace Engineering.
Optimal Vibration Reduction over a Frequency Range.
Technical rept.,
W. D. Pilkey, L. Kitis, and B. P. Wang. 1982, 35p Rept no. A-82-1
Contract N00014-75-C-0374

This is a review of optimal vibration reduction techniques for systems subject to harmonic excitation over a frequency range. Only passive means of control are considered. The objective functions used for optimization are restricted to those which relate directly to some measure of frequency response. Other common optimization goals such as weight minimization with response constraints are not included. (Author)

AD-A119 606/2 PC A03/MF A01
Virginia Univ., Charlottesville. Dept. of Mechanical and Aerospace Engineering.
Efficient Reanalysis of Locally Modified Structures.
Technical rept.,
B. P. Wang, and W. D. Pilkey. 1980, 27p Rept no. A-82-6
Contract N00014-75-C-0374

A unified efficient formulation for the static, dynamic, and stability reanalysis of locally modified structures is presented. The reanalysis problem is to find the structural responses when some of the element properties are adjusted as a result of design modifications. The reanalysis problem is formulated as a problem of much lower order than the original system. This is achieved by utilizing the linearity property of the structure using the pseudo-load concept, together with the solution of the original system. The modifications to the structure are treated as displacement dependent pseudo-loads of the system. By expressing the modified system response as linear combinations of the response of the original system and a term depending on the pseudo-load, a reduced set of response equations can be obtained. In the static and sinusoidal steady state analyses, this leads to a set of linear algebraic equations. For free vibration and stability analyses, this results in an eigenvalue problem. General modifications involve multiple parameters so that numerical solutions are required. Numerical examples are included. For the special case of a single parameter variation, a simple closed form formulation of the reanalysis problem is provided. Explicit reanalysis formulas are presented for changes in the cross-sectional area of truss members, the stiffness of beams, the thickness of plane stress elements, and lumped springs and masses. (Author)

AD-A119 626/0 PC A02/MF A01
Virginia Univ., Charlottesville. Dept. of Mechanical and Aerospace Engineering.
On the Optimal Location of Vibration Supports.
Technical rept.,
B. P. Wang, and W. D. Pilkey. 1982, 8p Rept no. A-82-3
Contract N00014-75-C-0374

The problem of optimal positioning of vibration supports to raise the fundamental natural frequency of a system is studied. It is established that for the optimal locations criterion the corresponding lowest antiresonant frequency is a maximum. A numerical example illustrates this criterion. (Author)

AD-A119 643/5 PC A03/MF A01
Virginia Univ., Charlottesville. Dept. of Mechanical and Aerospace Engineering.
A Receptance Formula for General Second Degree Square Lambda Matrices.
Technical rept.,
Alan B. Palazzolo, Bo Ping Wang, and W. D. Pilkey. 1982, 33p Rept no. A-82-5
Contract N00014-75-C-0374

A computational algorithm utilizing the free vibration modes of a structure is presented for calculating receptances. The usual eigen-system computed for large structural models is incomplete; hence the receptances are approximate. The formulas developed here increased receptance accuracy compared to classical spectral representations. Receptances are used extensively in eigensolution reanalysis, design and synthesis and also for forced harmonic response studies. In these areas receptance approaches offer a popular alternative to Rayleigh Ritz subspace type methods. Structural models represented by non-symmetric mass, damping and stiffness matrices, which occur frequently in rotating structures, may be treated using the receptance formulas presented. The receptance matrix derived is applicable to general, 2nd degree, square lambda matrices. This generalizes the receptance matrix commonly associated with matrix pencils. (Author)

DE82009183 PC A02/MF A01
Los Alamos Scientific Lab., NM.
Validation Experiences with a Nonlinear Shell of Revolution in ADINA and NONSAP.
W. A. Cook. Feb 82, 10p LA-9237-MS
Contract W-7405-ENG-36

Validation problems for a nonlinear shell-of-revolution finite-element model are described and tabulated. These problems prove this model to be versatile and accurate for solving problems, including nonlinear strains and materials and large rotations. Also, the Broyden-Fletcher-Goldfarb-Shanno solution method in ADINA improves the convergence of this model in the more difficult problems. (ERA citation 07:044348)

N82-31706/6 PC A02/MF A01
Lehigh Univ., Bethlehem, PA.
The Crack Problem for a Nonhomogeneous Plane.
F. Delale, and F. Erdogan. Jun 82, 22p NAS 1.26:169276, NASA-CR-169276
Contracts NGR-39-007-011, NSF CME-78-09737

The plane elasticity problem for a nonhomogeneous medium containing a crack is considered. It is assumed that the Poisson's ratio of the medium is constant and the Young's modulus E varies exponentially with the coordinate parallel to the crack. First the half plane problem is formulated and the solution is given for arbitrary tractions along the boundary. Then the integral equation for the crack problem is derived. It is shown that the integral equation having the derivative of the crack surface displacement as the density function has a simple Cauchy type kernel. Hence, its solution and the stresses around the crack tips have the conventional square root singularity. The solution is given for various loading conditions. The results show that the effect of the Poisson's ratio and consequently that of the thickness constraint on the stress intensity factors are rather negligible.

N82-31726/4 PC A03/MF A01
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
A Dynamic Identification Method for Complex Structures.
Ph.D. Thesis - Conservatoire National des Arts et Metiers, Paris.
L. Barthe-batsalle. 1982, 44p ONERA-NT-1982-3, ISSN-0078-3781
In French; English Summary. Report Will Also Be Announced as Translation (Esa-TT-780).

A global identification method for complex structures was developed to improve the finite element computation model for the study of harmonic vibrations based on measured natural modes. Modes are introduced as displacements imposed on a part of the structure in a static problem involving rigidity and mass operators. The method consists of seeking the unknown parameters which minimize the Euclidian norm of the reaction forces corresponding to the prescribed measured displacements. When numerous measured points are spread on the structure, it is possible to localize the modeling errors. Numerical results for a plate and an axisymmetric composite structure demonstrate the validity of this method.

N82-32008/6 PC A02/MF A01
Old Dominion Univ. Research Foundation, Norfolk, VA.
Integrating Matrix Formulations for Vibrations of Rotating BEAMS Including the Effects of Concentrated Masses.
Final Report.
W. D. Lakin. Jun 82, 17p NAS 1.26:165954, NASA-CR-165954
Contract NAS1-115648-58

By expressing partial differential equations of motion in matrix notation, utilizing the integrating matrix as a spatial operator, and applying the boundary conditions, the resulting ordinary differential equations can be cast into standard eigenvalue form upon assumption of the usual time dependence. As originally developed, the technique was limited to beams having continuous mass and stiffness properties along their lengths. Integrating matrix methods are extended to treat the differ-

ential equations governing the flap, lag, or axial vibrations of rotating beams having concentrated masses. Inclusion of concentrated masses is shown to lead to the same kind of standard eigenvalue problem as before, but with slightly modified matrices.

PB83-111484 PC **A08**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Coll. of Engineering.
Nonlinear Photoviscoelasticity: Theory and Measurement,
H. Brinson, A. Tougui, D. Gamby, and A. Lagarde.
Aug 82, 165p VPI-E-82-21
Prepared in cooperation with Poitiers Univ. (France).

Photoviscoelasticity and photoplasticity concepts are reviewed, and differences and similarities are discussed. The suggestion is made that a better understanding of nonlinear time varying birefringence enhances the utilization of polymeric materials for photoplasticity studies. A mathematical model for nonlinear photoviscoelasticity is presented. Measurements of optical creep and creep recovery are given, and comparisons between theory and experiments are made and discussed.

PB83-851766 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Mechanical Impedance. June, 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 124p
Supersedes PB80-858251.

This bibliography contains citations concerning the measurement, theory, and reduction methods of mechanical impedance. Assembled aerospace equipment, rotors, multiresonance systems, and machine tools are among the mechanical systems analyzed. (This updated bibliography contains 95 citations, 28 of which are new entries to the previous edition.)

20L. Solid-State Physics

AD-A119 534/6 PC **A04**/MF **A01**
Hughes Research Labs., Malibu, CA.
Electronic Processes in InP and Related Compounds.
Final rept. 10 Oct 80-9 Oct 81,
K. V. Vaidyanathan, C. L. Anderson, H. L. Dunlap, and G. S. Kamath. Jul 82, 53p
Contract N00019-80-C-0619

The growth and characterization of high-purity epitaxial layers grown by liquid-phase-epitaxy (LPE) are described. Chemical and electrical evaluation of the layers indicate that silicon and sulfur are the dominant residual donors in LPE-grown InP layes. Techniques for controlling these dopants are discussed. The current-voltage characteristics of Schottky diodes on p-InP are analyzed. Aluminum, silver, and gold were tried as Schottky-barrier metals. The results reported here demonstrate that Al is the best choice as the Schottky metal. An automated system has been used to measure the relative photoresponse from Schottky diodes. Photocurrent measurements due to pure electron and pure hole injection have been made as a function of bias applied to the sample. This data has been analyzed to yield ionization coefficients of electrons (alpha) and holes (beta) in InP. The results clearly demonstrate that holes have a larger ionization coefficient than electrons in InP. (Author)

AD-A119 668/2 Not available NTIS
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
Self-Consistent Calculations in InAs-GaSb Heterojunctions,
G. Bastard, E. E. Mendez, L. L. Chang, and L. Esaki.
27 Jan 82, 4p ARO-18683.15-PH
Contract DAAG29-81-C-0038
Availability: Pub. in Jnl. of Vacuum Science and Technology, v21 n2 p531-533 Jul/Aug 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 710/2 Not available NTIS
Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
A New Theory of Electronic Surface States,
D. H. Lee, and J. D. Joannopoulos. 27 Jan 81, 6p
ARO-15653.65-EL
Contract DAAG29-78-C-0020
Availability: Pub. in Jnl. of Vacuum Science and Technology, v19 n3 p355-359 Sep-Oct 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 737/5 PC **A08**/MF **A01**
Stanford Univ., CA. Stanford Electronics Labs.
Study of the Electronic Surface States of III-V Compounds and Silicon.
Semi-annual technical progress rept. 1 Oct 81-31 Mar 82,
W. E. Spicer, and I. Lindau. 31 Mar 82, 158p
Contract N00014-79-C-0072, DARPA Order-3564

Contents: The Ge-Ag Interface at Room Temperatures: An Energy Dependent Photoemission Study; The Si(III)/Pt Interface at Room Temperature: An Synchrotron Radiation Photoemission Study, Photoemission Investigation on the Oxidation of Si(III)-Ag Interfaces and Its Relation to the Interface Structure; Intermixing at the Early Stage of the Si(III)/Ag Interface Growth, Photoemission Studies of As and Its Room Temperature Oxidation; Photoemission Studies of Room-Temperature Oxidized Surfaces, Development and Confirmation of the Unified Model for Schottky Barrier Formation and MOS Interface States on III-V Compounds; Reply to "Surface Photovoltage Measurements and Fermi Level Pinning: comments on Development and Confirmation of the Unified Model for Schottky Barrier Formation and MOS Interface States on III-V Compounds" to be published in Thin Solid Films, The Use of Synchrotron Radiation to Study Oxygen and Metal Overlayers on GaAs (110) Surfaces; and Modified Schottky Barrier Heights by Interfacial Doped Layers: MBE Al on GaAs.

AD-A119 784/7 PC **A06**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Center for Materials Science and Engineering.
Molecular-Orbital Basis for Superconductivity in High- and Low-Dimensional Metals.
Interim technical rept.,
K. H. Johnson, and R. P. Messmer. 24 Sep 82, 102p
Rept no. TR-4
Contract N00014-81-K-0499

A real-space molecular-orbital description of electronic wave functions which are postulated to be the precursors of the superconducting state in high- and low-dimensional metals is presented, based on self-consistent X-alpha scattered-wave (SCF-X alpha-SW) molecular-orbital calculations for clusters representing the local molecular environments in these materials. It is shown that there is a persistent correlation between the occurrence of superconductivity in a material and the existence of spatially delocalized molecular orbitals at the Fermi energy which are bonding within and antibonding between 'layers' or 'tubes' of overlapping atomic orbitals that span many atoms, forming a type of 'electron network' at the Fermi energy, as exemplified by P pi 'layered' molecular-orbital topologies in Al and (TMTSF)2PF6, and by d sigma 'tabular' molecular-orbital topologies in Nb and Nb3Sn. This description of the precursor superconducting state is consistent with the original conjectures of London that the superconducting-state wave function is 'molecular' in nature, 'rigid' in character, and of wide spatial extent, from which observed physical properties (e.g., diamagnetism and nondissipative electrical currents) of the superconducting state logically follow.

DE82008430 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Observation of Quantum Noise Effects in a Resistively Shunted Josephson Junction.
R. H. Koch, D. J. Van Harlingen, and J. Clarke. Aug 81, 8p LBL-13748, CONF-810809-23
Contract W-7405-ENG-48
16. international conference on low temperature physics, Los Angeles, CA, USA, 19 Aug 1981.

The measured spectral density of the voltage noise in current-biased resistively shunted Josephson junctions in which quantum corrections to the noise are expected to be important is found to be in excellent agreement with theoretical predictions. The contribution at the measurement frequency of zero point fluctuations mixed down from frequencies near the Josephson frequency is clearly demonstrated. (ERA citation 07:054689)

DE82013549 PC **A02**/MF **A01**
Minnesota Univ., Minneapolis. School of Physics and Astronomy.
Far-Infrared Studies on Superconductors and Heat-Capacity Studies on Liquid Crystals. Progress Report, February 19, 1981-March 30, 1982.
C. Huang. 30 Mar 82, 6p DOE/ER/10461-3
Contract AC02-79ER10461

The progress report herein will deal with our measurement of low temperature heat capacity on one transforming V sub 3 Si sample as well as our testing results of one exp 3 He-cooled bolometer for far infrared studies. Our important contribution in understanding the nature of two liquid crystal phase transitions, i.e., smectic A - smectic C (SmA-SmC) and SmA - hexatic B will be included also. (ERA citation 07:044226)

PB83-851410 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Magnetic Permeability. June, 1970-October, 1982 (Citations from the NTIS Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 208p
Supersedes PB80-857857.

This bibliography contains citations concerning the analysis, calculations, and utilization of magnetic permeability in alloys and ferrous materials. Descriptions of anisotropic permeability, field analysis, loss calculation, laminated magnetic steel parts for electric transformers, flux patterns, resonance and relaxation components and electric resistivity are included. (This updated bibliography contains 179 citations, 47 of which are new entries to the previous edition.)

20M. Thermodynamics

AD-A119 619/5 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Integration of Finite Element Analysis Program for Conduction Heat Transfer with Computer Analysis Language.
Master's thesis,
Warren Leigh Roberts. Jun 82, 91p

The Finite Element Analysis Program (FEAP) was modified and integrated with the Naval Postgraduate School version of the Computer Analysis Language (CAL-NPS). This enables the solution of linear and non-linear, two and three dimensional heat conduction problems in an interactive mode. The usual types of boundary conditions, including radiation, may be specified. The heat conduction group includes prompts for user supplied data. Several existing CAL-NPS commands were improved and a 'HELP' facility was added. Commands were added for visual display of the finite element mesh at graphics terminals. The User Guide for this expanded version of CAL-NPS is provided. (Author)

N82-32192/8 PC **A03**/MF **A0**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
Fluid Thermodynamics.
R. Legendre. Jul 82, 30p ONERA-NT-1982-1, ISSN-0078-3781
In French; English Summary. Report Will Also Be Announced as Translation (Esa-TT-778).

The principles of macroscopic thermodynamics are introduced. Enthalpy, heat, and internal energy are explained. Thermal power machines and energy conservation are discussed. The entropy of two-parameter systems, and the Carnot cycle are examined. Irreversible cycles, and thermodynamic potential are treated.

20N. Wave Propagation

AD-A119 581/7 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.

Atmospheric Effects on Ultra High Frequency Radio Propagation.
Master's thesis,
Joseph Clent Boudreaux, III . Jun 82, 88p

The dependence of received power on range within and below atmospheric ducts was measured in conditions of elevated, nonhomogeneous, multilayered ducts. An aircraft with UHF transmitter covered the range 0 to 150 nm. from a shore based receiver. Range dependent maxima and minima in received power were detected at the surface in elevated duct conditions. The results were compared to predictions from ray, waveguide multi-mode, and single mode theories. Ray and single mode theories were inadequate to predict power patterns over the horizon. Multi-mode theory yielded qualitative agreement for conditions of deep, low elevated ducts. Agreement for higher, thinner, ducts was poor. Multilayered duct systems were observed and produced interference patterns without recognizable period with range. (Author)

AD-A119 596/5 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Measurement of Ground Dielectric Properties Using Wide-Angle Reflection and Refraction,
Steven A. Arcone, and Allan J. Delaney. Mar 82, 18p Rept no. CRREL-82-6

The interpretation of continuous radar profiles requires an alternative geophysical means of obtaining ground dielectric information. Ground dielectric properties were measured using wide-angle reflection and refraction (WARR) soundings with a ground-probing radar set that transmits pulses f a few nanoseconds duration. The investigations, carried out over sandy gravel in interior Alaska, provided dielectric data to about a 5-m depth. The WARR soundings were displayed as individual traces allowing interference between separate events and dispersion to be observed, and the soundings were compared with continuous radar and resistivity profiles conducted concurrently to extract the maximum amount of dielectric information. The dielectric constants, derived mainly from the direct ground waves propagating along the surface, ranged from 2.9 to 7.4. Dielectric values interpreted for one site predicted the possibility of a refracted event which may have occurred during one of the soundings. (Author)

AD-A119 682/3 Not available NTIS
Ohio State Univ., Columbus. ElectroScience Lab.
A Surface Patch Model for Polygonal Plates,
Edward H. Newman, and Pravit Tulyathan. 1 Apr 81, 7p ARO-17446.3-EL
Contracts DAAG29-81-K-0020, N00014-78-C-0049
Availability: Pub. in IEEE Transactions on Antennas and Propagation, vAP-30 n4 p588-593 Jul 82 (No copies furnished by DTIC/NTIS).

No abstract available.

DE82015446 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Calculation of Electromagnetic Fields with Variation in phi Axisymmetric Cavities. Part I. Basic Relations. Part II. Possibilities of the PRUD Code.
A. G. Daikovskii, Yu. I. Portugalov, and A. D. Riabov. 1982, 25p LA-tr-82-22
Contract W-7405-ENG-26
C IFVE-OMVI-80-107, 1980; IFVE-OMVI-81-60, 1981.

This paper discusses a method for calculation of natural frequencies and their corresponding electromagnetic fields in axisymmetric cavities of an arbitrary shape. The method is based on the representation of the equations for electrodynamics in variables H/sub phi/, E/sub phi/. Approximation of the equations for a numerical solution of the problem is realized by the method of finite elements.

21. PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A119 401/8 PC **A04**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistic Research Lab.
A Contribution to the Flat Flame Olympics: Problem B.
Final rept.,
Joseph M. Heimerl. Aug 82, 67p ARBRL-TR-02416, SBI-AD-F300 073
Portions of this paper reported at the 'GAMM-Workshop on Numerical Methods in Laminar Flame Propagation,' University of Aachen 12-14 Oct 81.

This report discusses in detail the input parameters used in computing flame speeds and profiles for the stoichiometric hydrogen-air premixed, steady-state, laminar flame. The input kinetics were specified. OUr solution was obtained by use of a relaxation technique. The partial differential equations were solved using a finite element method, PDECOL. A special algorithm that enabled spatial grid points to be placed in the flame front was used. Results include: (1)information requested by the workshop that deals with specific transport parameters, (2) computed flame speeds, (3) mass fraction peak values of radical species profiles, and (4) the extrema of the enthalpy profile. We also consider the likely sources of our computed HO2 'spike' and OH double peak. We also found features in the N2 and O2 mole fraction profiles that are due simply to the mass-to-mole fraction transformation. Finally, we have compared the flame speeds, radical peaks, and enthalpy extrema when two quite different transport mixing algorithms wore used.(etc.)

AD-A119 556/9 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Scale-Modeling of Inert Pressurant Distribution as Applied to Fire Extinguishment by Nitrogen Pressurization.
Final rept.,
J. P. Stone, F. W. Williams, H. W. Carhart, and R. C. Corlett. 20 Sep 82, 9p Rept no. NRL-8609

An approximate method for scale-modeling inert pressurant distribution in geometrically similar enclosures is applied with length scale factors of 3.84, 6, and 23 (prototype to model) for turbulent flow conditions. Modeling correlations are best in spaces with minimal clutter (no obstructions to flow). With considerable clutter, however, correlations were considered acceptable and indicated good mixing within less than an additional injection time.

AD-A119 614/6 PC **A04**/MF **A01**
Aerospace Corp., El Segundo, CA. Lab. Operations.
Studies of Plasma Properties in Rocket Plumes.
Interim rept. 1 Apr 81-31 Mar 82,
Richard H. C. Lee, I-Shih Chang, and Gordon E. Stewart. 17 May 82, 63p TR-0082(2619)-1, SD-TR-82-44
Contract F04701-81-C-0082

Various factors which affect the gas density and electron density distribution in the exhaust plume from solid rocket engines were studied. The particulates affect the plume density distribution through their effects on the nozzle flow field. The two-body attachment reaction Hcl + e = H + cl- is the dominant reaction in determining the ionization level in the nozzle expansion. The chemical and physical phenomena required to accurately determine the plume plasma properties for subsequent radio frequency interaction analysis are identified. (Author)

AD-A119 640/1 Not available NTIS
Illinois Univ. at Urbana-Champaign.
A Flammability-Limit Model for Upward Propagation through Lean Methane/Air Mixtures in a Standard Flammability Tube,
J. Buckmaster, and D. Mikolaitis. 11 Dec 80, 12p ARO-15882.25-MA
Contract DAAG29-79-C-0121, Grant NSF-ENG78-28086
Availability: Pub. in Combustion and Flame, v45 p109-119 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A119 748/2 PC **A04**/MF **A01**
Naval Research Lab., Washington, DC.
A One-Dimensional Time-Dependent Model for Flame Initiation, Propagation and Quenching.
Memorandum rept.,
K. Kailasanath, E. S. Oran, and J. P. Boris. 30 Sep 82, 58p Rept no. NRL-MR-4910

This report describes a one-dimensional, time-dependent, Lagrangian numerical model developed to study the initiation, propagation and quenching of laminar flames. A number of new approaches and algorithms as well as input parameters used in the model are discussed. Calculations of initiation and minimum ignition energies in hydrogen-oxygen-nitrogen mixtures are presented along with calculations of the burning velocity of hydrogen in air. (Author)

DE82002736 PC **A03**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
Long-Term Materials-Test Program: Quarterly Report, April-June 1981.
Oct 81, 48p DOE/ET/15457-181
Contract AC21-79ET15457
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The most significant achievement was the running of the qualification test. The major objective is to qualify the test rig as an operational system capable of providing an actual PFB environment to a candidate set of materials located in two downstream test sections. To demonstrate this capability, the testing was brought up to steady-state conditions via the established startup procedure. Then the test rig was run for a period of approximately 50 hours at design temperature and pressure parameters using a coal-to-dolomite feed rate of 2:1. The overall results indicated: the rig is capable of running at sustained high temperatures and pressure over long periods of time; dust loading and dust size distribution was approximately equivalent to previous test runs at the Exxon-Mini Plant; sulfur capture measured 79% (Ca/S = 1.5); and excess heat loss from the combustor to the LV Test Section inlet was detected, which will be improved by re-insulating the combustor and cyclone pressure vessels. The test was abruptly terminated due to a tube failure in the in-bed heat exchanger. Visual examination revealed that the combined effects of erosion and corrosion of the tube walls caused the failure. A new heat exchanger coil fabricated from 310 stainless steel will be installed. (ERA citation 07:049147)

DE82011558 PC **A06**/MF **A01**
Mechanical Technology, Inc., Fairfax, VA.
Equipment Performance Survey of the Georgetown University Atmospheric Fluidized Bed Boiler Plant.
Feb 82, 120p DOE/MC/14273-1136
Contract AC21-80MC14273
Portions of document are illegible.
Microfiche only after original copies are exhausted.

An equipment performance survey was conducted at the Georgetown University (GU) Atmospheric Fluidized Bed Boiler (AFBB) Plant by Mechanical Technology Incorporated (MTI), under contract with the US Department of Energy (DOE), Morgantown Energy Technology Center (METC). Review of daily operating logs and maintenance records identified incidences of malfunctions and their frequency for equipment in the AFBB plant, a project funded by the US DOE. Interviews with plant engineering, operating, and maintenance personnel were conducted to obtain details of the malfunctions, suspected causes, corrective action taken, and the results of the corrective action on ten selected equipment items. Based on the survey, technology gaps in equipment for AFBB plants were identified. (ERA citation 07:045647)

DE82903151 MF **A01**
Babcock and Wilcox Co., Alliance, OH. Research and Development Div.
Combustion Tests of Coal-Water Slurry. Final Report.
G. A. Farthing, Jr., S. A. Johnson, and S. J. Vecci.
Mar 82, 63p EPRI-CS-2286
Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

The results of an experimental test program to determine the combustion characteristics of coal-water slurry (CWS) fuels (65 to 75 percent dry coal by weight and exhibiting room temperature viscosities of about 1000 cp) are presented. The slurry tested contained 66 percent solids by weight and was produced from a beneficiated high volatile eastern bituminous coal. The CWS and its parent coal were each fired in B and W's 4.0 x 10 exp 6 Btu/hr Basic Combustion Test Unit. Each fuel was also subjected to extensive laboratory analysis work. No burner or atomizer development work was done - the primary objective of the study being to demonstrate that the CWS could be fired with existing fuel oil handling equipment. (ERA citation 07:042230)

N82-31641/5 PC **A09**/MF **A01**
Cornell Univ., Ithaca, NY.
Exhaust Gas Measurements in a Propane Fueled Swirl Stabilized Combustor.
M. S. Aanad. Aug 82, 177p NAS 1.26:169293, E-82-4, NASA-CR-169293
Grant NSG-3019

Exhaust gas temperature, velocity, and composition are measured and combustor efficiencies are calculated in a lean premixed swirl stabilized laboratory combustor. The radial profiles of the data between the co- and the counter swirl cases show significant differences. Co-swirl cases show evidence of poor turbulent mixing across the combustor in comparison to the counter-swirl cases. NO sub x levels are low in the combustor but substantial amounts of CO are present. Combustion efficiencies are low and surprisingly constant with varying outer swirl in contradiction to previous results under a slightly different inner swirl condition. This difference in the efficiency trends is expected to be a result of the high sensitivity of the combustor to changes in the inner swirl. Combustor operation is found to be the same for propane and methane fuels. A mechanism is proposed to explain the combustor operation and a few important characteristics determining combustor efficiency are identified.

N82-31772/8 PC **A08**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Workshop on an Assessment of Gas-Side Fouling in Fossil Fuel Exhaust Environments.
W. J. Marner, and R. L. Webb. Jul 82, 154p NAS 1.26:169269, JPL-PUB-82-67, NASA-CR-169269
Contracts NAS7-100, DE-AI07-80ID-12138
Workshop Held at Boulder, Colo., 8-9 Oct. 1981.

The state of the art of gas side fouling in fossil fuel exhaust environments was assessed. Heat recovery applications were emphasized. The deleterious effects of gas side fouling including increased energy consumption, increased material losses, and loss of production were identified.

N82-31776/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Gas Turbine Critical Research and Advanced Technology (Crt) Support Project.
Annual Report, Fiscal Year 1980.
E. R. Furman, D. N. Anderson, M. A. Gedwill, Jr., C. E. Lowell, and D. F. Schultz. Jul 82, 47p NAS 1.15:82872, E-1247, NASA-TM-82872
Contract DE-AI01-77ET-10350

The technical progress to provide a critical technology base for utility gas turbine systems capable of burning coal-derived fuels is summarized. Project tasks include the following: (1) combustion - to investigate the combustion of coal-derived fuels and the conversion of fuel-bound nitrogen to NOx; (2) materials - to understand and prevent the hot corrosion of turbine hot section materials; and (3) system studies - to integrate and guide the technological efforts. Technical accomplishments include: an extension of flame tube combustion testing of propane - Toluene Fuel Mixtures to vary H2 content from 9 to 18 percent by weight and the comparison of results with that predicted from a NASA Lewis General Chemical Kinetics Computer Code; the design and fabrication of combustor sector test section to test current and advanced combustor concepts; Testing of Catalytic combustors with residual and coal-derived liquid fuels; testing of high strength super alloys to evaluate their resistance to potential fuel impurities using doped clean fuels and coal-derived liquids; and the testing and evaluation of thermal barrier coatings and bond coatings on conventional turbine materials.

N82-32186/0 PC **A17**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Thermodynamic and Transport Combustion Properties of Hydrocarbons with Air. Part 1: Properties in SI Units.
S. Gordon. Jul 82, 397p NAS 1.60:1906, E-946, NASA-TP-1906

Thermodynamic and transport combustion properties were calculated for a wide range of conditions for the reaction of hydrocarbons with air. Three hydrogen-carbon atom ratios (H/C = 1.7, 2.0, 2.1) were selected to represent the range of aircraft fuels. For each of these H/C ratios, combustion properties were calculated for the following conditions: Equivalence ratio: 0, 0.25, 0.5, 0.75, 1.0, 1.25 Water - dry air mass ratio: 0, 0.03 Pressure, kPa: 1.01325, 10.1325, 101.325, 1013.25, 5066.25 (or in atm: 0.01, 0.1, 1, 10, 50) Temperature, K: every 10 degrees from 200 to 900 K; every 50 degrees from 900 to 3000 K Temperature, R: every 20 degrees from 360 to 1600 R; very 100 degrees from 1600 to 5400 R. The properties presented are composition, density, molecular weight, enthalphy, entropy, specific heat at constant pressure, volume derivatives, isentropic exponent, velocity of sound, viscosity, thermal conductivity, and Prandtl number. Property tables are based on composites that were calculated by assuming both: (1) chemical equilibrium (for both homogeneous and heterogeneous phases) and (2) constant compositions for all temperatures. Properties in SI units are presented in this report for the Kelvin temperature schedules.

N82-32188/6 PC **A16**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Thermodynamic and Transport Combustion Properties of Hydrocarbons with Air. Part 3: Properties in US Customary Units.
S. Gordon. Jul 82, 362p NAS 1.60:1908, E-948, NASA-TP-1908

Thermodynamic and transport properties are presented for a wide range of conditions for the reaction of hydrocarbons with air. The values given are in U.S. customary units.

21C. Electric Propulsion

N82-31499/8 PC **A06**/MF **A01**
Technische Univ., Vienna (Austria). Inst. fuer Allgemeine Elektrotechnik und Elektronik.
Spectroscopic Investigations of a Field Emission Generated Radiative Zone: Mass Spectroscopic Measurements.
Final Report.
J. Mitterauer. Oct 81, 106p ESA-CR(P)-1589
Contract ESTEC-2734/76/NL-AK(SC)

In view of the application of liquid metal field ion sources as electric thrustors for space propulsion, the basic physical features of the field ionization mechanism were analyzed experimentally. An ultrahigh vacuum test chamber and a liquid metal ion source were built. Diagnostic methods, e.g., basic measurements of the emission characteristics, probe measurements of the ion current distribution, mass spectroscopic measurements of the particles emitted from the ion source, and spectroscopic measurements of the visible radiation accompanying field ionization, were developed. Experimental data which can be transferred to prototype field ion thrusters are presented, but experimental facilities limit conclusions regarding theoretical aspects of field ionization.

21D. Fuels

AD-A119 563/5 PC **A03**/MF **A01**
Logistics Management Inst., Washington, DC.
Improving Energy Efficiency of Major Weapon Systems.
Final rept.,
Donna J. S. Peterson, and Connelly D. Stevenson.
Jul 82, 50p Rept no. LMI-ML111
Contract MDA903-81-C-0166

The increasing cost of fuel consumed by major weapon systems is a continuing concern for the Department of Defense (DoD). Because fuel costs are growing more rapidly than other Operating and Support (O&S) costs, they are consuming a growing fraction of the O&S budget. One solution to the problem is to place greater emphasis on acquiring energy efficient weapon systems. The efficient use of energy in major systems will help assure that the DoD will get the highest level of performance for every fuel dollar spent. The major system acquisition process serves as the framework for incorporating energy efficiency into system design and development. Not all systems are energy intensive and not all would benefit from increased attention to energy. This report defines a method for determining which systems are energy intensive using an energy consumption threshold specific to the warfare area of the system under consideration. We recommend that systems designated energy intensive be subjected to a more detailed analysis of energy consumption and cost, including the sensitivity of system life cycle costs to changes in energy costs. The report provides a case study to demonstrate how the recommended analytical methods can be performed within the life cycle cost analysis required for major weapon systems. (Author)

DE82006374 PC **A06**/MF **A01**
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Methane Recovery from Coalbeds Data Base System. Technical Progress Report.
R. D. Malone, and C. W. Byrer. Apr 81, 101p DOE/METC/TPR-82-4
Portions of document are illegible.
Microfiche only after original copies are exhausted.

The production of methane from coalbeds is one of the prime objectives of the Department of Energy's Methane Recovery from Coalbeds Project (MRCP). In order to fully understand and use the data obtained from the drilling of 45 wells throughout the US, a data base system has been developed by the Morgantown Energy Technology Center (METC). This report contains a description of the MRCP Data Base System Design and the reasons for the design methodology. The report also describes the potential compatibility with the US Geological Survey Data Base System and the US Bureau of Mines Data Base System. (ERA citation 07:052740)

DE82009174 PC **A06**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Utilization of Emergent Aquatic Plants for Biomass-Energy-Systems Development.
S. Kresovich, C. K. Wagner, D. A. Scantland, S. S. Groet, and W. T. Lawhon. Feb 82, 113p SERI/TR-98281-03
Contract AC02-77CH00178
Portions of document are illegible.
Microfiche only after original copies are exhausted.

A review was conducted of the available literature pertaining to the following aspects of emergent aquatic biomass: identification of prospective emergent plant species for management; evaluation of prospects for genetic manipulation; evaluation of biological and environmental tolerances; examination of current production technologies; determination of availability of seeds and/or other propagules, and projections for probable end-uses and products. Species identified as potential candidates for production in biomass systems include Arundo donax, Cyperus papyrus, Phragmites communis, Saccharum spontaneum, Spartina alterniflora, and Typha latifolia. If these species are to be viable candidates in biomass systems, a number of research areas must be further investigated. Points such as development of baseline yield data for managed systems, harvesting conceptualization, genetic (crop) improvement, and identification of secondary plant products require refinement. However, the potential pay-off for developing emergent aquatic systems will

be significant if development is successful. (ERA citation 07:042842)

DE82009505 PC A03/MF A01
North Carolina State Univ. at Raleigh.
Assessment of Existing Feuds Data Base for Identification of Potential Industrial Wood Users in North Carolina.
D. H. Gustashaw. Mar 81, 29p DOE/CS/30166-T16
Contract AC02-79CS30166

The North Carolina Wood Assistance Team's evaluation of the Ultrasystems' computerized methodology for identifying high potential wood conversion facilities is presented. The analysis, methodology, and data are found to be inadequate for the intended use. (ERA citation 07:042769)

DE82009654 MF A01
State Univ. of New York at Stony Brook. Dept. of Materials Science and Engineering.
Preparation, Characterization, and Use of Metal Hydrides for Fuel Systems. Progress Report, June 1, 1979-August 31, 1980. Final Report.
P. J. Herley. Aug 80, 31p DOE/ER/02715-T1, COO-5000-5
Contract AS02-76ER02715
Portions of document are illegible.
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The chemical reactivity of aluminum hydride, the alkaline-earth metal hydrides, and the alkali-metal alanates was investigated. All of the materials can be photolytically decomposed at room temperature with high intensity uv light to produce hydrogen gas irreversibly. alpha -AlH sub 3 , LiAlH sub 4 and NaAlH sub 4 powders can be irreversibly isothermally decomposed at elevated temperatures. Exposure of the material to exp 60 Co gamma rays modifies the decomposition. The rate constants of all thermal decomposition stages are increased with increasing dose, and the overall time to complete the decomposition is shortened. This effect has been interpreted as the result of the formation of additional decomposition nuclei by the radiation. The activation energies for the gamma -ray pre-irradiated material are the same as for the pristine material indicating that the same decomposition process is occurring in both. gamma -ray pre-irradiation also modifies the photolytic decomposition kinetics. However, the induced effects are complex and each material behaves differently with increasing gamma -ray dose. The crystal structure determinations on single crystal NaAlH sub 4 indicated that a different number of conjugate hydrogen atoms surround the alkali metal atoms in the alanates as the atomic weight of the alkali metal increases. The kinetic parameters and the behavior of the materials to uv light and various pretreatments can be used to evaluate the practical usefulness of these solids as lightweight hydrogen gas generators. Of all the hydrides examined, alpha -AlH sub 3 satisfies almost all of the necessary criteria. Apart from the fact that alpha -AlH sub 3 decomposes irreversibly to yield hydrogen and it cannot be recharged in situ, the material is ideal as a solid hydrogen gas generator. The residue is recyclable, the material is stable to water vapor and the decomposition temperature ideal. (ERA citation 07:044195)

DE82013011 PC A02/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Liquid Fuels by Direct Liquefaction of Biomass.
H. G. Davis, C. Figueroa, and L. L. Schaleger. Mar 82, 25p LBL-14155, CONF-820535-1
Contracts AC02-76SF00098, AC06-76RL01830
KTI annual high temperature processing technology symposium, Napa Valley, CA, USA, 9 May 1982.

Conversion of Douglas fir wood chips to a crude fuel oil, under an atmosphere of carbon monoxide, hydrogen and steam has been accomplished by at least two processes. An oil-wood-flour slurry (oil recycle) process has been operated smoothly at DOE's process development unit (PDU) in Albany, Oregon. Operability was achieved at the cost of extremely high recycle ratio of product oil (about 19/1) and of effluent water. A single pass, water-slurry process, originally developed at the Lawrence Berkeley Laboratory (LBL), has also been tested at Albany. LBL is currently operating a bench-scale continuous liquefaction unit. The feedstock has been an aqueous slurry of prehydrolyzed Douglas fir wood chips. Yields of oil product are higher than was estimated from the Albany experience but are consistently lower than achieved by the recycle process. The difference is real, and is caused by a greater formation of water-soluble products such as carboxylic acids in the water-slurry process. In work to date at LBL, no significant difference in either oil yield or product analysis has been found when the CO-H sub 2 reactant gas mixture is replaced by either CO or H sub 2 alone. Since CO feed largely reacts to form H sub 2 and CO sub 2 by shift reaction, it is economically desirable to use a hydrogen-rich reaction gas. The product oil is a crude material, feedable as a heavy liquid fuel oil at temperatures somewhat above ambient, very low in sulfur and nitrogen, but containing 10 to 19% oxygen, largely as phenols. The crude product has been shown to be capable of replacing number 6 fuel oil in the test boiler at the Pittsburgh Energy Technology Center. Process flow sheets, stoichiometry, operating problems, and methods of product characterization are discussed, as well as possibilities for an improved process. (ERA citation 07:046217)

DE82013223 PC A06/MF A01
Argonne National Lab., IL.
Development of Computer Simulations for Landfill Methane Recovery.
J. W. Massmann, C. A. Moore, and R. M. Sykes. Dec 81, 101p ANL/CNSV-26
Contract W-31-109-ENG-38
Microfiche only after original copies are exhausted.

Two- and three-dimensional finite-difference computer programs simulating methane recovery systems in landfills have been developed. These computer programs model multicomponent combined pressure and diffusional flow in porous media. Each program and the processes it models are described in this report. Examples of the capabilities of each program are also presented. The two-dimensional program was used to simulate methane recovery systems in a cylindrically shaped landfill. The effects of various pump locations, geometries, and extraction rates were determined. The three-dimensional program was used to model the Puente Hills landfill, a field test site in southern California. The biochemical and microbiological details of methane generation in landfills are also given. Effects of environmental factors, such as moisture, oxygen, temperature, and nutrients on methane generation are discussed and an analytical representation of the gas generation rate is developed. (ERA citation 07:044076)

DE82013265 PC A02/MF A01
Institute of Gas Technology, Chicago, IL.
Development of a Pressurized Fluidized-Bed Biomass Gasifier to Produce Substitute Fuels.
S. P. Babu, M. Onischak, and G. Kosowski. 1982, 12p CONF-820324-2
Contract AC02-80CS83004
Biomass-to-methanol specialists workshop, Durango, CO, USA, 3 Mar 1982.

The Institute of Gas Technology (IGT) is conducting a program to convert forest and crop residues to substitute fuel in a pressurized fluidized-bed biomass gasifier. The process is designed for operation at pressures up to 2.17 MPa (315 psia) and temperatures up to 1255 K (1800 exp 0 F). Various goals for synthesis or fuel gas processes are being pursued to develop an efficient process. Some of these goals are to maximize the throughput, the amount, and the quality of the gas, while minimizing both the amount of the feedstock preparation needed and the formation of condensible compounds that require by-product disposal and process wastewater treatment. The process development results obtained from fluidization, biomass devolatilization, and char gasification studies were used to design a 30.5-cm (12-inch) ID adiabatic fluidized-bed gasification process development unit (PDU), capable of handling up to 455 kg (1000 lb) of biomass per hour. The fluidized-bed gasifier performance is to be determined as a function of the standard operating parameters to develop a basis for recommending processes to produce either an industrial fuel gas for energy generation or a synthesis gas for methanol and ammonia production. (ERA citation 07:046185)

DE82013374 PC A06/MF A01
Oak Ridge National Lab., TN.
Short-Rotation Woody-Crops Program. Quarterly Progress Report for Period Ending August 31, 1981.
J. H. Cushman, and J. W. Ranney. Apr 82, 116p ORNL/TM-8157
Contract W-7405-ENG-26

Progress of twenty-one projects in the Short Rotation Woody Crops Program is summarized for the period June 1 through August 31, 1981. Individual quarterly reports included from each of the projects discuss accomplishments within specific project objectives and identify recent papers and publications resulting from the research. The major program activities are species screening and genetic selection, stand establishment and cultural treatment, and harvest, collection, transportation, and storage. (ERA citation 07:042826)

DE82013483 MF A01
Minnesota Agricultural Consultants, Inc., St. Paul.
Summary of the Economics Associated with the Combustion of Non-Woody Agricultural Biomass for Low-Temperature End-Use Applications.
F. J. Benson, and W. W. Grant. 11 Sep 81, 58p
MASEC-SCR-81-097
Contract AC02-79CS30150
Available in microfiche only.

The state-of-the-art research in the area of non-woody agricultural biomass use in low temperature direct combustion/gasification applications is summarized. Five economic issues of relevance to the total spectrum of non-woody agricultural biomass from production to utilization are presented. The resource base is discussed in terms of production, usability, environmental effects and the costs of using non-woody biomass. The agricultural biomass harvesting and transportation systems which might be used and their costs are described. The storage of non-woody agricultural biomass and the utilization of non-woody agricultural biomass and the demands that may be met with this product as a heat energy source are discussed. This section also discusses equipment availability for non-woody agricultural biomass combustion uses and then summarizes the economics of combustion as presented in various studies. A summary and evaluation of the overall application of non-woody agricultural biomass as a heat energy sources are presented. (ERA citation 07:042816)

DE82013508 PC A02/MF A01
Department of Energy, Pittsburgh, PA. Pittsburgh Energy Technology Center.
Transport Characteristics of Alternate Slurry Fuels. Quarterly Technical Progress Report, January-March 1982.
1982, 21p DOE/NBM-2013508

This paper presents the results of a preliminary series of tests to evaluate the transport and handling characteristics of coal-water mixtures (CWM) ranging in coal concentration from 58 to 65% by weight. The tests were conducted in a flow loop designed to simulate fuel handling systems typical of industrial boiler applications. The flow system is instrumented to measure line pressure, pressure drop, temperature, and fuel flow rate at a number of points. For the upper limit of the flow rates and for the Pittsburgh steam coal used in these tests, these conditions would represent an average thermal input of roughly 70 x 10 exp 6 Btu/h. Difficulties encountered in preparing the mixtures will be discussed, as will time-dependent changes in the effectiveness of the dispersing agents utilized. No attempt was made to prepare specially tailored particle size distributions that might increase the amount of coal in the mixture while maintaining the fluidity of the CWM. Results of the flow tests to date demonstrate the benefits to be gained from the use of dispersants. Pump discharge pressures and pressure drops around the loop were lower for the 65% CWM's made with a dispersant than were these same values for a 60% CWM made without a dispersant. The pressure loss data from a number of tests were analyzed with methods appropriate to pseudohomogeneous, non-Newtonian fluids. Laboratory measurements of the viscometric properties will be discussed and compared to the results from the flow loop. Future plans for the test loop will be discussed. (ERA citation 07:042202)

DE82013523 PC A10/MF A01
Pittsburg and Midway Coal Mining Co., Englewood, CO.
Solvent-Refined-Coal (SRC) Process: Trace Elements. Research and Development Report No. 53. Volume III. Pilot Plant Development Work. Part 6. The Fate of Trace Elements in the SRC Process. Final Report.
R. H. Filby, C. A. Grimm, V. Ekambaram, and M. L. Hunt. Apr 82, 213p DOE/ET/10104-52
Contract AC05-76ET10104

The initial efforts concentrated on the development of appropriate analytical procedures for thirty-nine ele-

ments. Sensitive neutron activation procedures were developed for Ti, V, Ca, Mg, Al, Cl, Mn, As, Sb, Se, Hg, Br, Co, Ni, Cr, Fe, Na, Rb, Ce, K, Sc, Tb, Eu, Sm, Ce, La, Sr, Ba, Th, Hf, Ta, Ga, Zr, and Cu in feed coals, process solvent, SRC solid and liquid products, mineral residues, filter cake, by-product solvents, process and effluent waters, and by-product sulfur. Atomic absorption spectrophotometric procedures were developed for Pb, Cd and Be in various plant-derived streams and materials including process and effluent waters. This study of the SRC-I process concluded that the bulk of the trace elements in the coal feed appear to concentrate in the mineral residue with two exceptions; bromine and titanium appear to concentrate in the SRC-I solid product. High mercury, selenium and arsenic levels in the process water were effectively reduced by the treatment process to essentially natural levels. The treatment and dilution process was effective for the removal of other trace elements from the process water. Study of the SRC-II process found that the vacuum bottoms was the major sink for all trace elements studied with the exception of mercury. Much lower trace element concentrations were found in the SRC-II liquid product relative to the vacuum bottoms or the feed coal, irrespective of coal type. Mercury, and to a lesser degree arsenic, selenium and antimony, exhibited volatile behavior in the SRC-II process but the degree of volatility was strongly dependent on conditions or coal type. (ERA citation 67:048988)

DE82015242 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Irreversible Effects in the FeTi/H System.
J. J. Reilly, J. R. Johnson, J. F. Lynch, and F. Reidinger. Mar 82, 19p BNL-31189R, CONF-820548-3
Contract AC02-76CH00016
International symposium on the properties and applications of metal hydrides, Toba, Japan, 30 May 1982.

The equilibrium hydrogen absorption isotherm using annealed, strain-free FeTi, exhibits only one plateau up to a composition of FeTiH/sub 1.95/. However, the desorption isotherm, determined immediately after the first hydriding step, exhibits the usual two plateaux. X-ray diffraction results of samples with compositions within the absorption plateau limits indicate the major phases present to be alpha and gamma , although a small amount of beta phase was always detected. Apparently the absorption isotherm represents the direct conversion of alpha implies gamma and beta phase precipitation is almost completely suppressed. Thermodynamic quantities for this conversion are given. The results are attributed to the influence of lattice strain upon the behavior of the beta 1 and beta 2 phases. A practical consequence of the effect is the distortion of the pressure-composition isotherm in the beta - gamma region as a function of hydriding-dehydriding cycles. This is caused by an increase in H solubility of the beta and gamma phases and the widening of the phase composition limits as the strain increases with cycle number. However, after many hundreds of cycles there is no further significant increase in strain and the isotherm shape becomes essentially fixed and reproducible. The distortion is reversible by mild annealing.

DE82015260 MF **A01**
Sandia National Labs., Albuquerque, NM.
Testimony on Coal Research Needs to the House Subcommittee on Energy Development and Applications.
R. K. Traeger. 1982, 10p SAND-82-1231C
Contract AC04-76DP00789
Available in microfiche only.

Discussions of this paper and interactions with the coal research community lead to the following conclusions on the future and needs for coal research: The coal resource in the USA is immense and a plan for optimum use of the peat to anthracite supplies should be developed and evolved. Coal research efforts in industry are rapidly decreasing and work at universities, technology centers and national laboratories is directly dependent on federal funding. Industrial emphases will shift to combustion and coal cleaning with limited development of gasification concepts. A cadre of scientists and engineers knowledgeable in coal processes needs to be maintained for evaluating environmental effects of coal use and for a design base in times of national emergencies. A major effort in understanding coal structure, chemistry and physics as related to behavior in processing is essential to developing environmentally acceptable processes and to identify revolutionary concepts for utilization of the national resource. Federal support of coal research is required to assure national needs of security, environmental protection and resource utilization are met. As the US energy base shifts from petroleum to coal, one can envision the development of a new coal refining industry. Evolution of such an industry can only occur if the data base on coal, coal properties and coal behavior is adequate to trigger the innovative thinking that has developed many US industries.

DE82900613 MF **A01**
Naemnden foer Energiproduktionsforskning, Stockholm (Sweden).
Inventory - Biomass. Progress Report Stage 3, Jul 1979 - Mar 1980.
S. Lindroth. 1980, 102p NE/BIO-81-17
In Swedish.Portions of document are illegible.
Microfiche copies only. Best available copy from document source.

The project is carried out at the institution of forest survey of the University of agriculture in Umeaa. The forest survey has been made more complete and a special mapping of three areas has been accomplished. The preliminary areas suitable for energy forest have been verified. The following gross figures are identified: wooded ground 1.3 million ha, swamp ground 2.1 million ha. The practically suitable ground is dependent on national and economic standards for evaluation. A separate inventory of wood wastes and of the quality of timber has been made. (ERA citation 07:042818)

DE82900649 MF **A01**
Delegationen foer Energiforskning, Stockholm (Sweden).
Utilizing Energy from the Forest, Today and in the Future.
Nov 79, 64p FSS-6
In Swedish.Portions of document are illegible.
U.S. Sales Only. Available in microfiche only.

The amount of energy produced from wooden material in Sweden in 1990 is estimated to be 10 Twh for wood waste, straw and municipal waste, 5 Twh for energy forests and 40 Twh for burning black liquor at pulp mills. The total amount of energy produced 1990 is estimated to 470 Twh. The Swedish plants for operation forest energy production presently in are reviewed in the report as well as design of the ballers. Having taken biological, ecological and environmental considerations into account and based on present day technology it is estimated that about 17 million m exp 3 of logging residue could be utilized during the 1990's, which represents some 3 million m exp 3 of oil Different systems for logging and transportation are described. (ERA citation 07:042810)

DE82900685 MF **A01**
Tekniska Hoegskolornas Energiarbetsgrupp, Stockholm (Sweden).
Synthetic Automotive Fuels and the Future Supply of Motor Fuels in Sweden.
A. Schwanbom, and I. Wallden. 1981, 48p THE-8
Portions of this report are illegible.
U.S. Sales Only. Available in microfiche only.

No abstract available.

DE82900767 MF **A01**
Naemnden foer Energiproduktionsforskning, Stockholm (Sweden).
Peat. Results, State of the Art, and Potentials. Progress Report from the NE Peat Program.
Mar 81, 127p NE-1981-5
In Swedish.Portions of document are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Results of projects supported by The National Swedish Board for Energy Source Development (NE) are presented in this report. The research activities have mainly been devoted to inventory methods, peat winning all the year around, peat processing and environmental investigations. Thermal conversion and artificial dewatering are the two most important areas of the peat processing program. Support will be granted for a prototype gasification plant for production of synthesis gas. If large scale dewatering becomes possible, it is very likely that peat will become one of the major Swedish fuel sources, together with coal and wood.

DE82900905 MF **A01**
Sveriges Lantbruksuniversitet, Uppsala. Inst. foer Ekologi och Miljoevaard.
Nitrogen Mineralization in Sphagnum Peat and Salix Leaf-Litter. Progress Report, 1978-1980.
U. Granhall, T. Siapokas, and I. Boerjesson. 1981, 31p SLU-ESO-TR-23, EFP-TR-23
In Swedish.Portions of document are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Studies on decomposition and N-mineralization of leaf litter and peat have been initiated. Leaf litter from varous Salix spp., Alnus incana, and Lupinus polyphylius are compared with respect to weight loss and change in N-content during in situ incubations using the litter bag technique in plots with different cultivation and fertilization procedures. Results with Salix clone 077 show that accumulation of N (10 to 30%) occur during the first year of decomposition. Accumulation is followed by N-release and total N-levels returned to initial values after about 1.5 years. Nitrogen in such litter is thus retained a relatively long time. Accumulation of N also occur in the rotovated peat itself for at least two years after field preparation, in spite of low or negligible weight loss. The reason for this is still unclear. The experiment continues. Laboratory experiments have also been made on the effects of soil moisture, temperature, liming and various nutrient amendents on total microbial activity (CO sub 2 -production) and N-netmineralization in ombrotrophic peat. (ERA citation 07:042857)

DE82901090 MF **A01**
Bayerische Landesanstalt fuer Landtechnik, Hohenthann (Germany, F.R.).
Straw and Wood Processing, Including Suitable Drying Processes.
A. Strehler, A. Perwanger, H. Mitterleitner, and E. M. Hofstetter. Apr 79, 127p NP-2901090
In German.Portions of document are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

A variety of plants designed for disintegrating and comminuting loose and compressed straw has been examined. The results obtained show that for most of the functions there are suitable plants available on the market, designed for disintegrating and comminuting individual trusses of straw. Specific energy requirements vary in function of the type of the plant. The farmhand large-truss chopper requires 1.8 kWh/dt, whereas a simple metering hopper combined with a harvester-thresher mounted chopper requires only 0.2 kWh/dt. Only by chopping it in special machines can waste wood (twigs, boughs, tree tops, barks) be brought into the shape required for utilizing cycle-saving machines and devices designed for the handling, processing, intermediate storing, sorting and dosing of fine particles into the press. A variety of choppers (brushwood choppers, culture choppers and trailed choppers) have been utilized with the aim to determine processing capacity, rate requirements and specific energy requirements, taking the degree of comminution into account. Specific energy requirements range between 0.15 kWh/dt (desintegration and little heaviness) and 2 kWh/dt (grinding, much heaviness). Technical straw drying is of little importance, since straw is generally dried in the field down to the required ultimate humidity of 14-16%. Should technical drying be necessary, conventional hay-drying plants may be used. The drying speed of chopped thinning wood (pulp chips) is relatively high as long as the particles are small as they were in the trial runs. Since wood - unlike food and feedstuff - cannot be expected to fall off in quality due to long drying cycles, the cheap process of ventilation without or with only little air heating may be used. (ERA citation 07:042820)

DE82903574 MF **A01**
Decision Focus, Inc., Palo Alto, CA.
Integrated Forecasting Model Synthetic Fuels Study. Volume 1. Overview and Findings. Final Report.
R. A. Marshalla. Apr 82, 161p EPRI/EA-2358-V.1
Portions of document are illegible.
Best available copy from document source. Available in microfiche only.

The future of a synthetic fuels industry in the United States, with particular emphasis on the consequences for the electric power industry, is assessed in this study. The assessment is based on use of the integrat-

ed Forecasting Model (IFM), a technology based integrated system model of the national energy economy. The study was performed under the general direction and advice of a working group composed of representatives from each of several EPRI divisions. This enabled the study to serve as a transfer vehicle for introducing the IFM as a general technology assessment and R and D planning tool. A series of model scenarios was structured around three key uncertainties bearing on the future of synthetic fuels: (1) synfuels process costs, (2) imported oil prices, and (3) system inertia, an aggregate representation of the effects of institutional and other factors on the maximum rate of market penetration of a new technology once it has become economically attractive. (ERA citation 07:042245)

N82-31548/6 PC **A04/MF A01**
Lockheed-California Co., Burbank.
Additional Experiments on Flowability Improvements of Aviation Fuels at Low Temperatures, Volume 2.
Final Report.
F. J. Stockemer, and R. L. Deane. Aug 82, 56p NAS 1.26:167912, NASA-CR-167912
Contract NAS3-21977

An investigation was performed to study flow improver additives and scale-model fuel heating systems for use with aviation hydrocarbon fuel at low temperatures. Test were performed in a facility that simulated the heat transfer and temperature profiles anticipated in wing fuel tanks during flight of long-range commercial aircraft. The results are presented of experiments conducted in a test tank simulating a section of an outer wing integral fuel tank approximately full-scale in height, chilled through heat exchange panels bonded to the upper and lower horizontal surfaces. A separate system heated lubricating oil externally by a controllable electric heater, to transfer heat to fuel pumped from the test tank through an oil-to-fuel heat exchanger, and to recirculate the heated fuel back to the test tank.

N82-31792/6 PC **A04/MF A01**
Roskilde Universitetscenter (Denmark). Inst. for Studiet af Matematik og Fysik Samt Deres Functioner i Undervisning, Forskning og Anvendelser.
Planning and Policy Considerations Related to the Introduction of Renewable Energy Sources into Energy Supply Systems. Energy Series No. 3.
B. Sorensen. Jan 81, 59p DE82-900828, TEKST-41

Elements of a methodology for long term energy planning with particular reference to the introduction of renewable energy technologies, and a methodology for comparative assessment of energy systems are discussed. The discussion comprises technical and economic viability, indirect economy, environmental and social impacts, as well as the influence of uncertainty on the assessment. The role of renewable energy in future energy supply systems is discussed, with separate treatment of the situation in developing countries and in highly industrialized countries. Finally, mechanisms for the mobilization of technical and financial requirements are touched upon.

PATENT-4 325 707 Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Coal Desulfurization by Aqueous Chlorination.
Patent.
J. J. Kalvinskas, N. Vasilakos, W. H. Corcoran, K. Grohmann, and N. K. Rohatgi. Filed 12 May 80, patented 20 Apr 82, 11p N82-29371/3, PAT-APPL-6-156 790
Supersedes PAT-APPL-6-156 790.Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A method of desulfurizing coal is described in which chlorine gas is bubbled through an aqueous slurry of coal at low temperature below 130 degrees C., and at ambient pressure. Chlorinolysis converts both inorganic and organic sulfur components of coal into water soluble compounds which enter the aqueous suspending media. The media is separated after chlorinolysis and the coal dechlorinated at a temperature of from 300 C to 500 C to form a non-caking, low-sulfur coal product.

PB83-109918 PC **A10/MF A01**
Institute of Gas Technology, Chicago, IL.
Gasification of Land-Based Biomass.
Annual rept. Jan-Dec 81,
D. E. Jerger, M. P. Henry, S. Ghosh, D. Q. Tran, and S. Babu. Sep 82, 204p 30546, GRI-81/0080
Contract GRI-5081-323-0463

The objective of this research is to develop efficient processes for conversion of land-based biomass to methane and other resources. One activity involved screening a variety of species to evaluate their reactivity under conditions of biological and thermal gasification. The second activity included advanced biogasification experiments on water hyacinth/sludge blend to optimize methane yields, production rates, and process stability through pretreatment and advanced reactor configurations designed to increase solids and microbial residence times. An anaerobic biogasification potential (ABP) bioassay was refined and applied to several herbaceous and woody species. Methane yields in the range of 4-8 SCF/1b VS added were obtained for most herbaceous and several woody species. These yields are substantially higher than reported previously for conventional digestion of these feeds. Of several pretreatment techniques evaluated, sodium hydroxide treatment resulted in improved methane yields with cotton gin trash and improved rates with cotton gin trash and woody species. The product gas for all four species was similar (CO 30%-40%, CO2 20%-25%, CH4 20%-28%, C2H6 5%). The results of the experiments were used to develop a kinetic model for the char gasification step. A kinetic model was developed for the biogasification of water hyacinth, primary sludge, and a blend of these feeds. A novel upflow solids digester and a stirred tank digester with solids recycle both achieved 20%-25% higher conversion of a blend of water hyacinth and sludge to methane. A preliminary design for an experimental test unit digester was completed for further design and installation at WDW. This unit will be employed for process scale-up and materials handling.

PB83-800789 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Underground Coal Gasification. 1979-September, 1982 (Citations from the NTIS Data Base).
Oct 82, 213p
Supersedes PB81-808024 and PB80-810047.

The bibliography of Federally-sponsored research relates to many aspects of in-situ gasification techniques, including rock fracturing, combustion, gas removal, economics, costs, and environmental factors. (This updated bibliography contains 205 citations, 49 of which are new entries to the previous edition.)

PB83-851725 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Biosynthesis in Biomass Conversion. 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Oct 82.
Oct 82, 340p
Supersedes PB82-858002.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning techniques and technology for the production of fuels and energy by the bioconversion of organic materials, especially wastes, from agriculture, forestry, and other human activities. It considers research, development, and applied technology pertaining to biosynthesis in biomass conversion. Legislative, legal, and public policy aspects of bioconversion are excluded. (This updated bibliography contains 345 citations, 37 of which are new entries to the previous edition.)

PB83-852343 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Magnetic Separation in the Coal Industry. 1976-October, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Oct 82.
Oct 82, 206p
Supersedes PB82-857426.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning the principles, systems, and equipment for magnetic separation applied to the coal industry. Pre-combustion coal preparation (cleaning, beneficiation, sorting, etc.) and post-combustion resource recovery by use of magnetic separators are considered, as is the associated abatement of pollution from coal combustion. (This updated bibliography contains 183 citations, 31 of which are new entries to the previous edition.)

21E. Jet and Gas Turbine Engines

AD-A119 729/2 PC **A04/MF A01**
Minnesota Univ., Minneapolis. Dept. of Mechanical Engineering.
Curvature Effects on the Heat Transfer Performance of Three-Dimensional Film Cooling of Gas Turbine Blades.
Final rept. 25 Jun 79-24 Jun 82,
E. R. G. Eckert, and R. J. Goldstein. Aug 82, 65p
ARO-16595.6-EG
Contract DAAG29-79-C-0117

Film cooling is used extensively for the blades of high-performance, high-temperature gas turbines, especially for aircraft turbines. In this method, a film of coolant is injected into the boundary layer covering the skin of the blades and creating a cool layer which separates the blade surface from the hot gas stream and, in this way, reduces the blade temperature. For best performance the coolant should be injected through a slot or a strip of porous material. This, however, is not possible for turbine blades because of strength considerations, and the coolant is injected through one or several rows of holes. For aircraft gas turbines, air is used as a coolant. The present investigation, therefore, is concerned with the cooling performance of film cooling when cooling air is injected into the boundary through one or two rows of holes. A standard configuration of the coolant holes is used because it has been used in previous investigations and because configurations in actual turbine blades are close to it. The cooling holes are arranged at a distance apart equal to three times the hole diameter. For injection through two rows of holes, the two rows are staggered and the centers of the holes are on the corners of equilateral triangles. The channels which end at the blade skin in the cooling holes are inclined by an angle of 35 deg against the skin surface in the downstream direction.

DE82902161 MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Investigation Concerning the Production of Turbine Blades and Vanes Using High Temperature High Strength in-Situ-Composites.
A. Donner. 1981, 90p BMFT-FB-T-81-039
In German.Portions of this report are illegible.
U.S. Sales Only. Best available copy from document source. Available in microfiche only.

Directionally solidified eutectic alloys (in-situ-composites) show superior creep properties in comparison with common super-alloys used both in aeronautical and industrial gas turbines. The aim of the R and D project was therefore to evaluate techniques of directional solidification for (air cooled) turbine blades and vanes made of eutectic alloys. The work is based on first results on rod like specimens. An adequate facility for the process of directional solidification (d.s.) was designed and built up, suitable d.s. parameters, ceramic shell moulds and ceramic cores were developed. The results of the experiments proved the possibility of the production of air cooled aeronautical engine blades and vanes by the application of the d.s. process on eutectic alloys of type C 73 - using ceramic cores. The results of the d.s. process were also satisfying as to the production of the large blades for industrial gas turbines. Regarding the macrostructure of large internally cooled vanes there is still some need in the improvement of the process. (ERA citation 07:043221)

N82-31328/9 PC **A05/MF A01**
Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.
Development of a Spinning Wave Heat Engine.
Final Report.
B. T. Zinn, E. A. Powell, and J. E. Hubbartt. Aug 82, 100p NAS 1.26:165611, NASA-CR-165611
Contract NAG3-96

A theoretical analysis and an experimental investigation were conducted to assess the feasibility of developing a spinning wave heat engine. Such as engine would utilize a large amplitude traveling acoustic wave rotating around a cylindrica chamber, and it should not

suffer from the inefficiency, noise, and intermittent thrust which characterizes pulse jet engines. The objective of this investigation was to determine whether an artificially driven large amplitude spinning transverse wave could induce a steady flow of air through the combustion chamber under cold flow conditions. In the theoretical analysis the Maslen and Moore perturbation technique was extended to study flat cylinders (pancake geometry) with completely open side walls and a central opening. In the parallel experimental study, a test moel was used to determine resonant frequencies and radial pressure distributions, as well as oscillatory and steady flow velocities at the inner and outer peripheries. The experimental frequency was nearly the same as the theoretical acoustic value for a model of the same outer diameter but without a central hole. Although the theoretical analysis did not predict a steady velocity component, simulaneous measurements of hotwire and microphone responses have shown that the spinning wave pumps a mean flow radially outward through the cavity.

N82-31449/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Environmental and High-Strain Rate Effects on Composites for Engine Applications.
C. C. Chamis, and G. T. Smith. 1982, 20p NAS 1.15:82882, NASA-TM-82882
Previously Announced in Iaa as A82-30118. Presented at the 23RD Struct. Dyn. And Mater. Conf., New Orleans, 10-12 May 1982; Sponsored by Aiaa, Asme, Asce, and AHS.

The Lewis Research Center is conducting a series of programs intended to investigate and develop the application of composite materials to structural components for turbojet engines. A significant part of that effort is directed to establishing resistance, defect growth, and strain rate characteristics of composite materials over the wide range of environmental and load conditions found in commercial turbojet engine operations. Both analytical and experimental efforts are involved.

N82-31642/3 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY.
Flow Process in Combustors.
F. C. Gouldin. Jun 82, 16p NAS 1.26:169294, NASA-CR-169294
Grant NSG-3019

Fluid mechanical effects on combustion processes in steady flow combustors, especially gas turbine combustors were investigated. Flow features of most interest were vorticity, especially swirl, and turbulence. Theoretical analyses, numerical calculations, and experiments were performed. The theoretical and numerical work focused on noncombusting flows, while the experimental work consisted of both reacting and nonreacting flow studies. An experimental data set, e.g., velocity, temperature and composition, was developed for a swirl flow combustor for use by combustion modelers for development and validation work.

N82-31643/1 PC **A12**/MF **A01**
Oklahoma State Univ., Stillwater. School of Mechanical and Aerospace Engineering.
Investigations of Flowfields Found in Typical Combustor Geometries.
Semiannual Status Report, 1 Feb. - 31 Jul. 1982.
D. G. Lilley. 31 Jul 82, 252p NAS 1.26:169295, SASR-4, NASA-CR-169295
Contract NAG3-74

Experimental and theoretical research undertaken on 2-D axisymmetric geometries under low speed, nonreacting, turbulent, swirling flow conditions is reported. The flow enters the test section and proceeds into a larger chamber (the expansion ratio D/d = 2) via a sudden or gradual expansion (sidewall angle alpha = 90 and 45 degrees). Inlet swirl vanes are adjustable to a variety of vane angles with values of phi = 0, 38, 45, 60 and 70 degrees being emphasized.

N82-31708/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Tensile Buckling of Advanced Turboprops.
C. C. Chamis, and R. A. Aiello. 1982, 25p NAS 1.15:82896, E-1276, NASA-TM-82896
Presented at the 23RD Struct., Struct. Dyn. And Mater. Conf., New Orleans, 10-12 May 1982; Sponsored by Aiaa, Asme, Asce and AHS.

Theoretical studies were conducted to determine analytically the tensile buckling of advanced propeller blades (turboprops) in centrifugal fields, as well as the effects of tensile buckling on other types of structural behavior, such as resonant frequencies and flutter. Theoretical studies were also conducted to establish the advantages of using high performance composite turboprops as compared to titanium. Results show that the vibration frequencies are not affected appreciably prior to 80 percent of the tensile speed. Some frequencies approach zero as the tensile buckling speed is approached. Composites provide a substantial advantage over titanium on a buckling speed to weight basis. Vibration modes change as the rotor speed is increased and substantial geometric coupling is present.

21G. Reciprocating Engines

AD-A119 610/4 PC **A04**/MF **A01**
Southwest Research Inst., San Antonio, TX. Army Fuels and Lubricants Research Lab.
Installation of a Diesel Engine Combustion/Ignition Evaluation Facility.
Interim rept. Oct 80-Sep 81,
D. M. Yost, T. W. Ryan, III , and E. C. Owens. Dec 81, 72p Rept nos. AFLRL-156, SWRI-6800-123
Contracts DAAK70-80-C-0001, DAAK70-82-C-0001

A facility for examining shale fuel property-related combustion/ignition effects on diesel engine performance has been installed at the U.S. Army Fuels and Lubricants Research Laboratory (AFLRL). The facility consists of a single-cylinder conversion of a three-cylinder, two-stroke cycle engine, an engine instrumentation package for determining combustion efficiencies, and a dedicated system for rapid data acquisition. The computer system and software has been developed with the flexibility to expand into other areas of fuels and combustion research. The facility will be an effective tool in the continuing development of Army mobility fuels. (Author)

AD-A119 658/3 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Mechanical Engineering.
Diesel Combustion Analysis Using Rapid Sampling Techniques.
Final rept. Jul 78-Jul 82,
G. L. Borman, P. S. Myers, and O. A. Uyehara. Aug 82, 13p ARO-14251.3-EG, ARO-15788.3-EG
Contract DAAG29-80-C-0129, Grant DAAG29-78-G-0146

The purpose of the research was to obtain a better understanding of the fundamental processes which take place in a diesel cylinder during combustion. A single cylinder, open chamber engine with a special head designed to allow in-cylinder sampling was used for the research. Using a conventional injector, two kinds of sampling projects were carried out; timed sampling of small local samples using a probe and total cylinder sampling, achieved by suddenly expanding and transferring 80% of the cylinder content to a quench chamber. A third study used an electronic fuel injection system to study the effects of injection parameters on performance, heat release, ignition delay and exhaust emissions.

DE82010263 MF **A01**
Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.
Random and Unsteady Combustion Processes in Diesel Engine Noise. Final Report.
W. C. Strahle. 1979, 34p DOE/ET/11342-T1
Contract AS05-77ET11342
Portions of this report are illegible.
Best available copy from document source. Available in microfiche only.

Progress is reported in a study in which the primary technical goal was to demonstrate that a significant part of the cylinder pressure spectrum in diesel engines is caused by random, not periodic, pressure fluctuations and that these random fluctuations cause a substantial amount of noise. Tasks were carried out on two engines, a single cyclinder four stroke and an eight cylinder two stroke engine. For the four stroke engine it was found that between 25 and 50% of the noise radiated was indeed due to the random cylinder pressure fluctuations. For the two stroke engine, only about 25% of the noise could be ascribed to this effect. Variables investigated on both engines were load and speed. Additional variables checked on the single cylinder engine were injection timing and alcohol addition. In all cases the results were checked for contamination of the signal due to transducer vibration. Multiple analysis methods were applied to the data to assure validity.

DE82011332 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Experimental Study of an Integral Catalytic Combustor: Heat Exchanger for Stirling Engines.
D. L. Bulzan. 1982, 21p DOE/NASA/51040-36, NASA-TM-82783, CONF--820203--3
Contract AI01-77CS51040
Society of Automotive Engineers international congress and exposition, Detroit, MI, USA, 22 Feb 1982.
Portions of document are illegible.
Microfiche only after original copies are exhausted.

An experimental study was conducted to determine the feasibility of using catalytic combustion with heat removal for the Stirling engine to reduce exhaust emissions and also improve heat transfer to the working fluid. The study was conducted using spaced parallel plates. An internally air-cooled heat exchnger was placed between two noble metal catalytic plates. A preheated fuel-air mixture passed between the plates and reacted on the surface of the catalyzed plates. Heat was removed from the catalytic surface by radiation and convection to the air-cooled heat exchangers to control temperature and minimize thermal NO/ sub x/ emissions. The study was conducted at inlet combustion air temperatures from 850 to 900 K, inlet velocities of about 10 m/s, equivalence ratios from 0.5 to 0.9, and pressures from 1.3 x 10 exp 5 to 2.0 x 10 exp 5 Pa. Propane fuel was used for all testing. Combustion efficiencies greater than 99.5% were measured. NO/sub x/ emissions ranged from 1.7 to 3.3 g NO sub 2 /kg fuel. The results demonstrate the feasibility of the concept and indicate that further investigation of the concept is warranted. (ERA citation 07:047312)

21H. Rocket Motors and Engines

N82-32256/1 PC **A12**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Ramjets and Ramrockets for Military Applications.
Mar 82, 266p AGARD-CP-307, ISBN-92-835-0312-X
Mostly in English; One in French. Proceedings of 58TH Propulsion and Engergetics Symp., London, 26-29 Oct. 1981.

No abstract available.

21I. Rocket Propellants

AD-A119 422/4 PC **A08**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Investigation of Experimental Techniques for Obtaining Particulate Behavior in Metallized Solid Propellant Combustion.
Final rept. Feb 80-Dec 81,
S. G. Karagounis, V. D. Diloreto, T. R. Gillespie, II , E. Dubrov, and P. J. Hickey. Jul 82, 152p AFRPL-TR-82-51
Contracts F04611-80-X-0032, F04611-81-X-0003
Sponsored in part by Contracts F04611-81-X-0066 and F04611-82-X-0008.

The goal of this initial investigation was to develop and compare experimental techniques that could be used for obtaining quantitative data on the effects of propellant properties, operating pressure and nozzle geometry on the behavior of metallized particulates within the grain port and nozzle of solid propellant rocket motors. The techniques employed were high speed motion pictures of strand burners and slab burners in a cross-flow environment, SEM analysis of post-fire residue (strand, slab, and motor), determination of D32 at the exit of an exhaust nozzle using measurements of scattered laser power spectra, and holograms of burning propellant strands and slabs in a cross-flow environ-

ment. All techniques were successfully developed and employed to obtain particulate size data from a series of specially formulated propellants. The motion picture and holographic techniques were successfully demonstrated for operating pressures of 34 and 68 atm. and with up to 15% aluminum. Fourteen micrometer resolution was obtained in the high speed motion pictures with a 1.12X magnification (and very small depth of field) and eleven micrometer resolution was obtained in the holograms. Measurements of D32 at the nozzle exit plane of a small end-burning motor were in close agreement with size analysis of collected exhaust particulates. (Author)

PAT-APPL-6-392 995 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Cure Catalyst for Polyurethanes.
Patent Application,
Adolf E. Oberth, and Julius Rothenstein. Filed 23 Jun 82, 17p AD-D009 694/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Described herein is an improved cure catalyst, ferric-bis(acetylacetonato)oxinate, for urethane polymers derived from polyetherdiols and thiols, polybutadienediols and triols, polyesters and the like.

PAT-APPL-6-393 170 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Bonding Agent for Polyurethanes.
Patent Application,
Rolf S. Bruenner, and Adolf E. Oberth. Filed 28 Jun 82, 15p AD-D009 696/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved bonding agent for a solid rocket propellant, having the general formula X2N(CH2CH2NX)nCH2CH2NX2(HO3SC6H4CH3)z wherein n is an integer having a value of 1 to 11, X is -H or -CH2CH2CN; wherein the amount of -CH2CH2CN, expressed as Y, is in the approximate range of 0.15 (n+4) to 0.45 (n+4), the amount of HO3SC6H4CH3, expressed as z, is in the approximate range of 0.01 (n+4) to 0.25 (n+4), and the ratio y:z is in the range of 1.5:1 to 3:1. (Author)

PATENT-4 337 102 Not available NTIS
Department of the Air Force, Washington, DC.
High Energy Solid Propellant Composition.
Patent,
Adolf E. Oberth, and Howard A. Price. Filed 4 Feb 80, patented 29 Jun 82, 4p AD-D009 719/6, PAT-APPL-6-118 008
Supersedes PAT-APPL-6-118 008, AD-D007 126.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This report describes a system for improving the mechanical properties of high energy propellants utilizing solid poly(ethylene oxide) diol polymeric binders by adding minor amounts of soluble perchlorate salts to the propellant formulation.

PB83-851626 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Monopropellants. June, 1970-October, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Oct 82.
Oct 82, 67p
Supersedes PB80-855349.

This bibliography contains citations concerning research and development of such monopropellants as aerozine, isopropyl nitrate and hydrazine. Characteristics, burning properties, catalytic decomposition, future applications, and present uses are discussed. Safety awareness considerations relative to material handling are also included. (This updated bibliography contains 65 citations, 35 of which are new entries to the previous edition.)

22.

SPACE TECHNOLOGY

22A. Astronautics

N82-31399/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Mission Report: Sts-4 Test Mission Simulates Operational Flight. President Terms Success Golden Spike in Space.
1982, 4p

The fourth space shuttle flight is summarized. An onboard electrophoresis experiment is reviewed. Crew physiology, the first getaway special, a lightning survey, shuttle environment measurement, prelaunch weather conditions, loss of solid rocket boosters, modification of thermal test program, and other events are also reviewed.

N82-31404/8 PC **A07**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Preliminary Analysis of Sts-3 Entry Flight Data.
Aug 82, 150p NAS 1.15:81373, NASA-TM-81373

The primary test objectives of STS 3 entry were to gather additional stability and control data at the higher Mach numbers and to expand the autoland operational envelope down to 200 feet. A time history of the entire entry and a list of the significant test conditions are shown. The weight, cg, and inertia characteristics used in the analyses are also shown.

N82-31729/8 PC **A08**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
FIREX Mission Requirements Document for Renewable Resources.
F. Carsey, and T. Dixon. 15 Jun 82, 175p NAS 1.26:169288, JPL-PUB-82-47, NASA-CR-169288
Contract NAS7-100

The initial experimental program and mission requirements for a satellite synthetic aperture radar (SAR) system FIREX (Free-Flying Imaging Radar Experiment) for renewable resources is described. The spacecraft SAR is a C-band and L-band VV polarized system operating at two angles of incidence which is designated as a research instrument for crop identification, crop canopy condition assesements, soil moisture condition estimation, forestry type and condition assessments, snow water equivalent and snow wetness assessments, wetland and coastal land type identification and mapping, flood extent mapping, and assessment of drainage characteristics of watersheds for water resources applications. Specific mission design issues such as the preferred incidence angles for vegetation canopy measurements and the utility of a dual frequency (L and C-band) or dual polarization system as compared to the baseline system are addressed.

N82-31730/6 PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
FIREX Mission Requirements Document for Nonrenewable Resources.
T. Dixon, and F. Carsey. 15 Jun 82, 89p NAS 1.26:169289, JPL-PUB-82-46, NASA-CR-169289
Contract NAS7-100

The proposed mission requirements and a proposed experimental program for satellite synthetic aperture radar (SAR) system named FIREX (Free-Flying Imaging Radar Experiment) for nonrenewable resources is described. The recommended spacecraft minimum SAR system is a C-band imager operating in four modes: (1) low look angle HH-polarized; (2) intermediate look angle, HH-polarized; (3) intermediate look angle, HV-polarized; and (4) high look angle HH-polarized. This SAR system is complementary to other future spaceborne imagers such as the Thematic Mapper on LANDSAT-D. A near term aircraft SAR based research program is outlined which addresses specific mission design issues such as preferred incidence angles or polarizations for geologic targets of interest.

N82-32009/4 PC **A07**/MF **A01**
Houston Univ., TX. Dept. of Electrical Engineering.
Research on Numerical Algorithms for Large Space Structures.
Final Report, 15 Mar. 1981 - 31 Oct. 1982.
E. D. Denman. 31 Oct 82, 145p NAS 1.26:169279, NASA-CR-169279
Grant NSG-1603

Numerical algorithms for large space structures were investigated with particular emphasis on decoupling method for analysis and design. Numerous aspects of the analysis of large systems ranging from the algebraic theory to lambda matrices to identification algorithms were considered. A general treatment of the algebraic theory of lambda matrices is presented and the theory is applied to second order lambda matrices.

N82-32194/4 PC **A11**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
NASA 1981 Photography Index.
1982, 248p NAS 1.15:84835, NASA-TM-84835

An index of representative photographs is presented. Color transparencies and black and white glossies of major launches, Mariner spacecraft, Pioneer spacecraft, planets and other space phenomena, Skylab, space shuttle, Viking spacecraft, and Voyager spacecraft are included.

22B. Spacecraft

AD-A119 644/3 PC **A03**/MF **A01**
State Univ. of New York at Buffalo, Amherst.
Investigation of Power Processing Technology for Spacecraft Applications.
Final rept. 1 May 81-31 Mar 82,
A. S. Gilmour, Jr. Jun 82, 35p AFWAL-TR-82-2054
Contract F33615-81-C-2011

This report summarizes an investigation of power processing technology applicable to future satellite electrical power systems. The issues of AC vs DC distribution are addressed as is the optimum distribution voltage. DC distribution is recommended. Distributions voltage should be as high as practical but less than 270 volts. (Author)

AD-A119 712/8 Not available NTIS
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
Electrostatically Figured Reflecting Membrane Antennas for Satellites.
Jeffrey H. Lang, and David H. Staelin. 26 Sep 80, 6p ARO-15653.66-EL
Contract DAAG29-78-C-0020
Availability: Pub. in IEEE Transactions on Automatic Control, vAC-27 n3 p666-670 Jun 82 (No copies furnished by DTIC/NTIS).

No abstract available.

N82-31347/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Delta Launch of the Telesat-G Mission.
24 Aug 82, 34p NAS 1.15:84834, M-492-201-82-05, NASA-TM-84834

Launch and deployment characteristics for the TELESAT-G (Anik-D) communications satellite are provided.

N82-31397/4 PC **A05**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).

Hybrid Equations for Translational and Rotational Motion of Flexible Spacecraft.
P. T. L. M. Vanwoerkom. 29 Sep 81, 77p NLR-TR-81116-U
Contract NIVR-1910

Equations of motion of a generic spacecraft with a rigid main body, and with flexible appendages, rotors, and jets on or in the main body were obtained by hybrid coordinate modeling. The equations were linearized to obtain the motion equations of three-axis stabilized spacecraft. The reduction of the exact motion equations to those describing the motion of a multibody spacecraft, composed of rigid main body with finite moments of inertia and of point masses with zero moments of inertia, is outlined.

N82-31403/0 PC **A06**/MF **A01**
Decision Science, Inc., San Diego, CA.
Toward Autonomous Spacecraft.
Final Report.
L. J. Fogel, P. G. Calabrese, M. J. Walsh, and A. J. Owens. Jun 82, 125p NAS 1.26:165948, NASA-CR-165948
Contract NAS1-16621

Ways in which autonomous behavior of spacecraft can be extended to treat situations wherein a closed loop control by a human may not be appropriate or even possible are explored. Predictive models that minimize mean least squared error and arbitrary cost functions are discussed. A methodology for extracting cyclic components for an arbitrary environment with respect to usual and arbitrary criteria is developed. An approach to prediction and control based on evolutionary programming is outlined. A computer program capable of predicting time series is presented. A design of a control system for a robotic dense with partially unknown physical properties is presented.

N82-31406/3 PC **A08**/MF **A01**
ERNO Raumfahrttechnik G.m.b.H., Bremen (Germany, F.R.).
Standardization Program on Design Analysis and Testing of Inserts in Nonmetallic Sandwich Components, Phase 1.
W. H. Paul, and D. Wagner. 10 Dec 81, 171p TR-TS-RP-2-05-81, ESA-CR(P)-1585
Contract ESA-440/80/NL-AK(SC)

In order to allow for reliable application of inserts in nonmetallic sandwich elements, the state of the art of insert technology is reviewed. Areas where further development is necessary are: load carrying capability of inserts in carbon fiber reinforced plastic sandwich loaded in plane of facing; residual strength and remaining life after passing a sequence of repeated loads; the behavior of potting resin under elevated temperatures; and the coupling between resin and facing, in order to judge insert torsion resistance. A test program which allows for verification of this analysis is presented.

N82-31407/1 PC **A04**/MF **A01**
Fulmer Research Inst. Ltd., Stoke Poges (England).
Guidelines for Selection of Fibre Reinforced Composite Materials for Spacecraft Applications.
A. K. Green. Jan 82, 56p R878/1A, ESA-CR(P)-1586-V-1
Contract ESA-4389/80/NL-AK(SC)

The properties of fiber reinforcement and matrix systems available for the fabrication of advanced composite structures are reviewed, and guidelines on the procurement of these materials are presented. Kevlar, S and S2 glass, FP alumina, boron, silicon carbide, and carbon fibers are discussed. Composite matrices covered are: epoxy, polyester and high temperature thermosetting resins; and thermoplastic and metal structures.

N82-31408/9 PC **A06**/MF **A01**
Fulmer Research Inst. Ltd., Stoke Poges (England).
Guidelines for the Use of Kevlar Aramid Reinforcing Fibres in Spacecraft Construction.
A. K. Green. Jan 82, 113p R878/2A, ESA-CR(P)-1586-V-2
Contract ESA-4389/80/NL-AK(SC)

The properties and application areas for Kevlar aramid fibers are described. The manufacture and machining of Kevlar laminates are discussed, taking Kevlar 49 laminates as an example. Uses of Kevlar in spacecraft include: filament wound motor cases and pressure vessels; textile reinforced deployable structures; thermally stable composite structures; impact protection; and as a weight saving replacement of glass fiber composite parts. Industrial uses of Kevlar include the reinforcement of rubber, and in high performance cables and textiles.

N82-31410/5 PC **A06**/MF **A01**
Fulmer Research Inst. Ltd., Stoke Poges (England).
Guidelines for the Use of Beryllium in Spacecraft Applications.
D. P. Bashford. Jan 82, 156p R878/4A, ESA-CR(P)-1586-V-4
Contract ESA-4389/80/NL-AK(SC)

The status of beryllium technology is reviewed, highlighting advances in beryllium powder comminution and consolidation techniques. Methods of fabricating spacecraft components for a variety of structural, optical, thermal, and instrument applications are presented, citing examples of the use of beryllium in European spacecraft. Difficulties and constraints in the designing of beryllium components are emphasized. Listings of beryllium producers and machining facilities are included.

N82-31411/3 PC **A08**/MF **A01**
Centre National d'Etudes Spatiales, Toulouse (France).
Report on the State of the ART in Space Mechanisms Rapport sur l'Etat de l'ART dans le Domaine des Mechanismes Spatiaux.
R. Salome, and L. Petitjean. 24 Mar 82, 153p CNES-82/CT/PRT/SST/ST/104
Text in French.

Antenna pointing, solar panel orientation, deployment, remote handling, and rendezvous and docking mechanisms are reviewed. Actuators, gears, brackets, bearings, electric signal/power transmission, shock absorbers, brakes, and position/speed indicators are considered.

N82-31646/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Studies of Implicit and Explicit Solution Techniques in Transient Thermal Analysis of Structures.
H. M. Adelman, R. T. Haftka, and J. C. Robinson. Aug 82, 47p NAS 1.60:2038, L-15245, NASA-TP-2038

Studies aimed at an increase in the efficiency of calculating transient temperature fields in complex aerospace vehicle structures are reported. The advantages and disadvantages of explicit and implicit algorithms are discussed and a promising set of implicit algorithms with variable time steps, known as GEARIB, is described. Test problems, used for evaluating and comparing various algorithms, are discussed and finite element models of the configurations are described. These problems include a coarse model of the Space Shuttle wing, an insulated frame tst article, a metallic panel for a thermal protection system, and detailed models of sections of the Space Shuttle wing. Results generally indicate a preference for implicit over explicit algorithms for transient structural heat transfer problems when the governing equations are stiff (typical of many practical problems such as insulated metal structures). The effects on algorithm performance of different models of an insulated cylinder are demonstrated. The stiffness of the problem is highly sensitive to modeling details and careful modeling can reduce the stiffness of the equations to the extent that explicit methods may become the best choice. Preliminary applications of a mixed implicit-explicit algorithm and operator splitting techniques for speeding up the solution of the algebraic equations are also described.

N82-31970/8 PC **A07**/MF **A01**
SKF Technology Services, King of Prussia, PA.
Research Report: User's Manual for Computer Program AT81Y005. PLANETSYS, a Computer Program for the Steady State and Transient Thermal Analysis of a Planetary Power Transmission System.
Final Report.
G. B. Hadden, R. J. Kleckner, M. A. Ragen, G. J. Dyba, and L. Sheynin. May 81, 142p NAS 1.26:165366, SKF-AT81DO44, NASA-CR-165366
Contract NAS3-22690

The material presented is structured to guide the user in the practical and correct implementation of PLANETSYS which is capable of simulating the thermomechanical performance of a multistage planetary power transmission. In this version of PLANETSYS, the user can select either SKF or NASA models in calculating lubricant film thickness and traction forces.

22C. Spacecraft Trajectories and Reentry

AD-A119 505/6 PC **A03**/MF **A01**
Naval Surface Weapons Center, Dahlgren, VA.
A Mathematical Description of the Low-Altitude Satellite Mission Planning Tool (LAMP).
Final rept.,
A. D. Parks. Jan 82, 39p Rept no. NSWC/TR-81-456

The Low-Altitude Mission Planning tool is capable of providing accurate long-term (approx. 90 day) predictions of key Keplerian orbit parameters and related quantities for one or two low-altitude satellites. Analytically modeled averaged variational equations are used to represent the effects of the geopotential oblateness upon satellite motion. Satellite drag perturbations are taken into account using a hybrid drag decay model which accounts for atmospheric oblateness and diurnal density variation. Adjustments to orbital parameters due to thrusting are modeled using analytical results obtained fom the Lagrange Planetary equations when impulsive thrusting is assumed. Propellant mass expenditures can also be obtained. This planning tool has application in the following areas: Operational interruption prediction; Propellant depletion rate studies; Operational flight strategy development; Orbit adjust impact assessment, and General mission planning. (Author)

N82-31342/0 PC **A06**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Determination of Simplified Analytical Expressions for the Calculation and Propagation of Orbits by the Use of the Theory of Parameter Estimation Determinacao de Expressoes Analiticas Simplificadas Para Calculo E Propagacao de Orbitas Mediante O USO de Teoria de Estimacao de Parametros.
Ph.D. Thesis.
W. C. C. Dasilva. Feb 82, 112p INPE-2320-TDL/080
Text in Portugese.

The principal perturbations on artificial satellites orbits are discussed and an approximated mathematical model using parameterized expressions is proposed to represent the time variation of orbit elements. The parameters in these expressions are determined from observational (or simulated) data, employing estimation theory through the use of Kalman filtering sequential techniques. The analytical expressions obtained allow orbit predictions with significant saving in time and without the need of sophisticated computational resources.

N82-31344/6 PC **A03**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
SEASAT Orbit Determination from Laser Range Observations.
K. F. Wakker, B. A. Ambrosius, and T. Vanderploeg. Apr 82, 36p VTH-LR-352
Presented at Surge Discussion Meeting on Seasat in Europe, London, 14-16 Apr. 1982.

The sensitivity of SEASAT orbit solutions and parameter estimations to the applied gravity and atmospheric drag model was investigated. For the gravity field the NASA GEM-9, GEM-10B, PGS-S3 and PGS-S4 models were used. Atmospheric drag was modeled by constant and time-varying cross-sectional areas and adjustable drag coefficients. Although PGS-S4 is the best SEASAT gravity model, computed orbits show a distinct sinusoidal trend in the along-track position error component. By solving for a limited number of gravity field coefficients a modified PGS-S4M model with considerably reduced along-track errors is obtained.

N82-31350/3 PC **A06**/MF **A0**
Instituto de Pesquisas Espaciais, Sao Jose do Campos (Brazil).

Rapid Prediction of the Orbital Lifetime of Satellites Previsao Rapida Do Tempo de Vida de Satelites.
M.S. Thesis - 1981.
K. R. Rao. Feb 82, 123p INPE-2330-TDL/081
In Portuguese; English Summary.

Preliminary mission planning and analysis of satellites, the design of satellite equipment like batteries, and the planning of onboard scientific experiments, require rapid estimates of orbital lifetimes for satellites for various injection conditions. A method for rapid and resonably accurate prediction of orbital lifetimes of satellites in the altitude range of 150 to 2000 km is presented. Small perturbation equations are used with the atmospheric drag as the chief perturbative force. It is shown that, by making a proper choice of the exospheric temperature, the CIRA-1972 atmospheric model gives very good results with enormous saving of computer time, when compared with the more detailed atmospheric description where the density is calculated as a function of local mean solar time, latitude, and other geophysical parameters. The drag coefficient was calculated using kinetic theory. For a hypothetical launch vehicle and satellite, an analysis of the effect of injection angle error on the orbital lifetime was made.

N82-31351/1 PC **A06**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Adaptive Orbit Estimation Applied to Low Altitude Satellites Estimacao Adaptativa de Orbitas Aplicada a Satelites a Baixa Altitude.
M.S. Thesis.
H. K. Kuga. Feb 82, 121p INPE-2316-TDL/079
Text in Portugese.

Estimation procedures are implemented and tested, aiming application to problems of real time orbit determination of low altitude satellites. Adaptive techniques of Dynamic Model Compensation and noise state evaluation are used in a sequential way, making the real time processing of the satellite observational data feasible. In order to test these procedures, satellite orbits and observations made by topocentric tracking stations are simulated in a digital computer. The performance of the estimation procedures is analyzed in terms of accuracy, convergence and statistical consistency, by comparison of estimated and simulated data.

22D. Spacecraft Launch Vehicles and Ground Support

N82-31346/1 PC **A03**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
Comparison of Various Satellite Tracking Station Coordinate Solutions.
H. J. D. Piersma. May 82, 29p VTH-M-424

A least squares method which determines the transformation parameters required in order to relate one coordinate system to another, and a computer program which carries out the transformation between systems are described. The most important parameters are shown to be the rotation about the pole axis, which indicates the extent to which orientation differs between the two systems, and the scale factor, which reflects the differing values of the Earth gravitation parameter. Comparison of station coordinates derived from standard systems with a base set shows best agreement for PGS-S4, PGS-STR1, and PGS-L1.

N82-31352/9 PC **A99**/MF **A01**
Centre National d'Etudes Spatiales, Toulouse (France).
The Future of Launchers in Europe.
1982, 678p
Partly in French and English. Proc. Of Intern. Conf., Paris, 19-21 Jan. 1982.

No abstract available.

N82-31396/6 PC **A04**/MF **A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
Study on Launchers for Future Specialized Missions. Volume 1: Summary Report.
R. G. Reichert, and H. T. Uebelhack. Mar 81, 57p ESA-CR(P)-1598
Contract ESA-4453/80/F-FC(SC)

The disposal in space of nuclear waste from Western Europe is discussed. Waste packaging, launcher systems, waste disposal destinations, reentry and impact protection systems, and safety aspects are considered. For a late 1990's mission, a ballistic recoverable, two stage orbit launch vehicle, is proposed, with waste disposed in the heliocentric orbit, at the rate of 80 (unmanned) launches per year. Reentry, and impact protection, system weighs 15,000 kg for a 7500 kg waste payload. The waste is enclosed in a glass matrix.

N82-31600/1 PC **A09**/MF **A01**
Selenia S.p.A., Rome (Italy). Space Activities Div.
Radar Altimeter Phase a Study: Signal Processor Simulation.
Final Report.
6 Jan 82, 137p TN-0126/81, ESA-CR(P)-1580
Contract ESA-4428/80

The locking transients and sensitivity of the signal processor height tracking, slope tracking, and automatic gain control loops were analyzed mathematically and simulated on an HP 9825 A computer. The system was evaluated with the loops interconnected and separate. The effects of fading and of environment transitions were considered. A procedure for passing from acquisition to tracking phase was defined. Results show that the system meets requirements as to slope accuracy, tracking performance, and observation time, if suggested improvements are incorporated in the design.

KEYWORD INDEX

NTIS®

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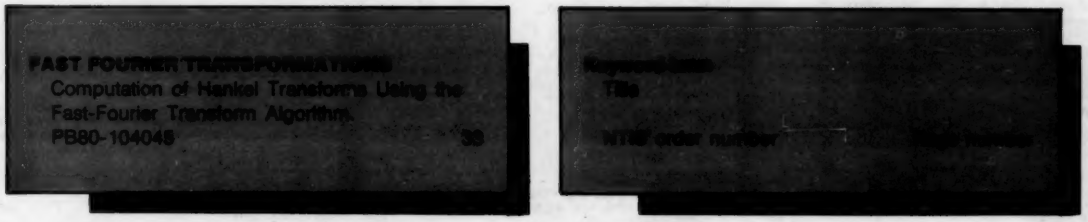

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IEEE Conference Record of 1982 Fifteenth Power Modulator Symposium, 14-16 June 1982.
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Cell-Module and Fuel-Conditioner Development. 5TH Quarterly Report, July-September 1981.
DE82007758 284

Fuel-Cell Applied Research: Electrocatalysis and Materials. Quarterly Report, April 1-June 30, 1981.
DE82015839 288

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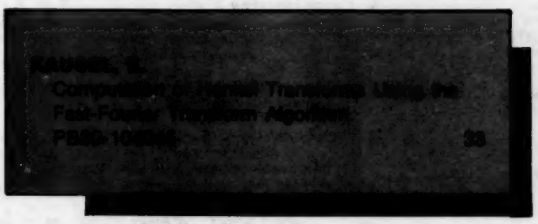

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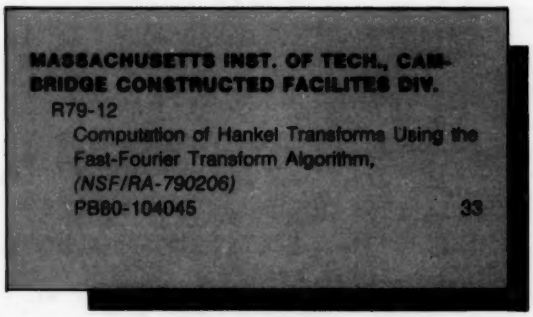

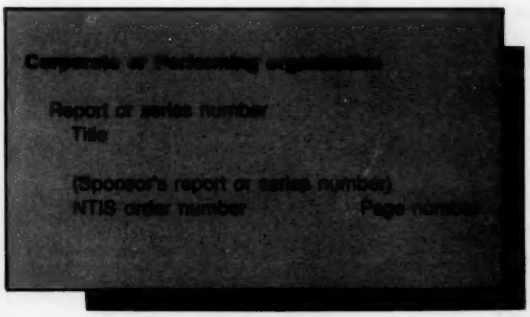

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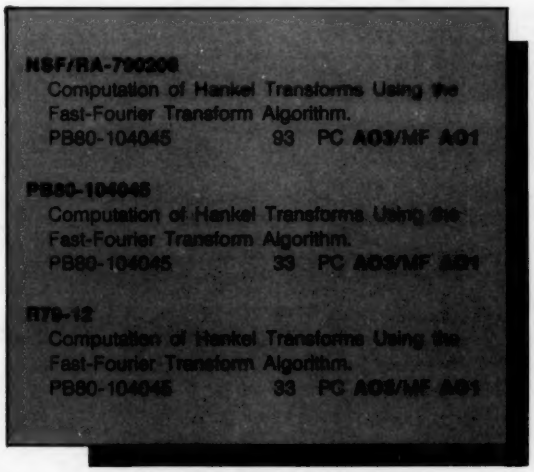
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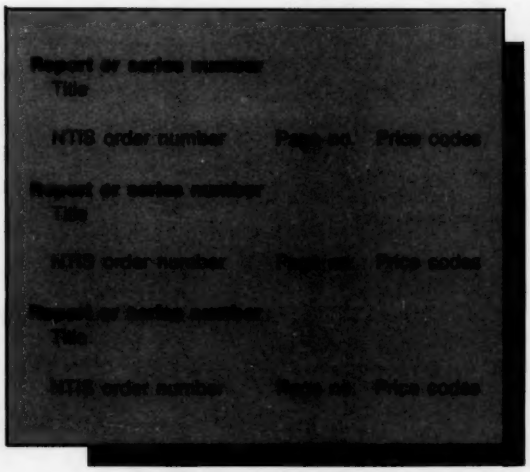
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